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CONTRIBUTIONS TOWARD A MONOGRAPH OF THE MUTILLIDAE AND THEIR ALLIES OF AMERICA NORTH OF MEXICO

BY JAMES CHESTER BRADLEY

IV. A REVIEW OF THE MYRMOSIDAE

The term Myrmosidae is here used in the exact sense in which it was applied by Dr. Ashmead, that is to include those Scolioid wasps which in the female sex are always wingless and have the thorax divided into two distinct parts (as contrasted with three in Thynnidae or the entirely undivided condition of the Mutillidae), and which in the male sex are distinguished from Mutillidae by the possession of an anal lobe on their hind wings, but possess no very definite characters distinct from the Thynnidae. It is very doubtful whether the females provisionally associated with *Brachycistis* really belong there, and until the female sex of that genus is known, its status in the Myrmosidae must remain an open question.

I make use of the family group Myrmosidae tentatively and merely as a matter of convenience, without wishing to express any convictions concerning its limits, or the advisability of recognizing it as a distinct family.

It may not be out of place to note, however, that the middle coxae of *Chyphotes* are widely separated, which would throw them into the Thynnidae by Dr. Ashmead's tables, that the wing venation of *Brachycistis* (figure 5), *Typhoctes* (figure 3), and *Chyphotes* (figure 4), are of a type very different from that of *Myrmosa* (figure 2), which is on the contrary more analogous to that of *Methoca* in the Thynnidae, or of *Telephoromyia* and other Thynnidae. While the hypopygium of *Myrmosa* is unarmed, *Brachycistis*, *Typhoctes*, and *Chyphotes*, as well as *Methoca* in the Thynnidae, have their hypopygia armed with a recurved aculeus similar to that of *Elis* [= *Plesia* and *Myzine*].

In this paper, as in the others of the series, I have entered the synonymy of each species only in so far as it differs from, or is

additional to, that given by Fox in his Monograph.¹ The color nomenclature is, for the most part, that of Mr. Robert Ridgway.²

A KEY TO THE GENERA OF MYRMOSIDAE KNOWN TO OCCUR IN AMERICA NORTH OF MEXICO

1. Ocelli of the female present; hypopygium of the male unarmed; marginal cell of the fore-wings long, reaching nearly to the apex of the wing (figure 2); posterior coxae each with a prominent lamina on its upper surface at base. **Myrmosa** Latreille
 Ocelli of the female absent; hypopygium of the male armed with an aculeus; marginal cell extending but a short distance beyond the stigma, or ending in it (figure 5) (2)
2. Middle tibiae with two apical spurs; in the males the first abdominal segment consisting of a basal petiolar portion and an apical more or less gibbous portion, the two separated by a transverse suture; mesosternum of the males without a caudal lamella on each side of the middle projecting over the base of the coxa. (3)
 Middle tibiae with one apical spur; basal abdominal segment not consisting of two parts; mesosternum with a prominent caudal lamella on each side of the middle encasing the base of the coxa. (Males.) . . . **Brachycistis** Fox
3. Abdomen petiolate; posterior coxae simple. (4)
 Abdomen sessile; posterior coxae each with a prominent lamina on its upper surface at base. (Females) **Brachycistis** Fox (?)
4. Front wings with the transverse part of M_2 wanting; the cell R_5 about one-half the size of the cell $R + 1st R_1$; R_5 present and not far apical of the radial cross-vein (figure 3); the first abdominal segment of the female greatly widened before the apex. **Typhoctes** Ashmead
 Front wings with M_2 complete; the cell R_5 joined with R_4 , the vein R_4 far apical of the radial cross-vein, the two united cells thus nearly as long as the cell $R + 1st R_1$, or in some cases both cells R_4 and R_5 present and distinct (figure 4); petiole of the females filiform throughout.
 **Chyphotes** Blake

MYRMOSA Latreille

Type: *Mutilla nigra* Rossi, = *M. melanocephala* Fabricius.
Myrmosa was originally described without included species, and *Mutilla nigra* was placed in it by Latreille in 1802.

¹ The North American Mutillidae. By William J. Fox. Transactions of the American Entomological Society. 1899. 25: 219 to 292.

² Color Standards and Color Nomenclature. By Robert Ridgway, Washington, D. C., published by the Author, 1912. 3 p. l., iv, 44 p., 53 col. pl., 22 cm.

A KEY TO THE SUBGENERA

Males

1. R_5 opposite the radial cross-vein; cell R_5 triangular, no longer than cell R_4 (figure 2); pygidial segment toward the apex with a deep longitudinal furrow, making it appear as though divided into two lobes, the apex lobed; first ventral segment armed with a recurved hook, the second with a tubercle or hook at base; clypeus flat, with a longitudinal median keel below the antennae..... **Myrmosa** Latreille
- R_5 far apicad of the radial cross-vein; cell R_5 not triangular, longer than cell R_4 (figure 1); pygidial segment tapering to the almost acute, very slightly notched apex, without a longitudinal impression; first and second ventral segments simple; clypeus convex, without a keel.

Myrmosula new subgenus*Females*

In this sex no division of the genus is known, the species are therefore all recorded under the typical subgenus *Myrmosa* Latreille.

A KEY TO THE SPECIES OF THE SUBGENUS MYRMOSA KNOWN TO OCCUR IN AMERICA NORTH OF MEXICO

Males

- Pubescence white. (Eastern.)..... **unicolor** Say
 Pubescence black. (Californian.)..... *species non descripta*

Females

1. Anterior half of the second dorsal segment closely punctured.....(2)
 Anterior half of the second dorsal segment polished and shining, with only few and scattered punctures. Length 3 to 5 mm..... **banksi** new species
2. Basal abdominal segment with a transverse dorsal carina; posterior metatarsi with prominent spines; posterior tibiae with two or three rows of very prominent spines. Length 6 to 8 mm..... **unicolor** Say
 Basal abdominal segment without such a carina; posterior metatarsi without noticeable spines (there are a few largely hidden by pubescence); posterior tibiae with fewer spines, these small and inconspicuous. Length 4 mm..... **blakei** new species

Myrmosa (**Myrmosa**) **unicolor** Say, ♂, ♀.1886. *Mutilla thoracica* Blake, Trans. Amer. Ent. Soc., 13: 204, ♀.

Professor Melander is doubtless correct in associating *thoracica* with *unicolor*. He remarks upon the occurrence of the females in gravel pits among the numerous burrows of *Halictus*, and my own specimens come from exactly similar situations.

MASSACHUSETTS: Woods Hole, common, (A. L. Melander). NEW YORK: Rochester Junction, June 19, 30, July 11, 1914, 4 ♂, (M. D. Leonard), [Cornell University]; Ithaca, August 6, 1885, 1 ♂, (E. H. Sargent), [Cornell University]; June 24, 1900, 1 ♂, [Cornell University]; August, 1916, 1 ♀, (the author), [Cornell University]; McLean, Cortland County, August, 1916, (the author), [Cornell University]; Rhinebeck, July 27, 1907, 1 ♂, (C. R. Crosby), [Cornell University]. PENNSYLVANIA. VIRGINIA: Falls Church, June 27, 30, July 4, 5, 14, 20, 21, 28, September 4, 12 ♂, August 2, 4, 11, 17, September 7, 5 ♀, (N. Banks), [N. Banks and Cornell University]; Glencarlyn, July 11, 26, 3 ♂, (N. Banks), [N. Banks]; High Island, June 23, 1 ♂, (N. Banks), [N. Banks]; Great Falls, June 25, 3 ♂, (N. Banks), [N. Banks]. ILLINOIS: Lake County, common, (A. L. Melander). "NORTHWEST TERRITORY" (Say). Fox states Canada and Virginia westward to Colorado.

This is evidently a species essentially of the Carolinian Fauna. Where it extends into the Transition, as at Ithaca, it is of very rare occurrence. Rochester Junction, in New York State, where it is more common, is a region distinctly more Carolinian in its tendencies.

Myrmosa (Myrmosa) banksi new species, ♀.

♀. Mahogany red, the abdomen except tip of first segment reddish black, legs a trifle more pallid, head a little darker; clothed with only minute and sparse pubescence. Length, 3.2 mm.; paratypes, 3.4 mm.

Head much rounded, narrowed behind the eyes, very sparsely and minutely punctulate; ocelli minute, about .02 mm. in diameter, the posterior pair .15 mm. from each other and .28 mm. from the eyes; face with a prominent spine between the antennae; border of clypeus not margined. First segment of the flagellum as broad as long, equal to the pedicel and shorter than the second segment.

Thorax with its sides contracted well toward the caudal end, but not strongly; the dorsum finely rugulose; lateral pieces of pronotum striolate; pleura impunctate and polished; caudal aspect of propodeum smooth and polished.

Petiole smooth and polished, toward its apex with two transverse, sinuous ridges, beyond which it is minutely punctulate, ventrally it bears a short thin keel, which is truncate in front and behind and notched beneath; second and following segments minutely and very sparsely punctulate, polished; pygidium with setigerous punctulations at its base.

The paratypes generally have the head a trifle less finely punctulate, but sparsely so; the thorax and first abdominal segment sometimes Sanford's brown. Two specimens from Pennsylvania, presumably of this species, differ in being considerably larger, about 5 mm. in length, and with the head rather coarsely punctured, in one of them both closely and coarsely punctured.

Type material.—Holotype: *Virginia*: Falls Church, August 11, (Nathan Banks), [Cornell University, No. 128.1]. Fourteen paratopotypes, August 7, 11 and 14, (N. Banks), [N. Banks and Cornell University].

Two specimens from Beatty, Pennsylvania, [Amer. Ent. Soc.] may be different.

Myrmosa (**Myrmosa**) **blakei** new species, ♀.

♀. Mahogany red; a large transverse spot on the second dorsal segment, and the entire dorsal segments 3 to 6, black; apical ventral segments, legs more or less, and the front, infuscated; pubescence sparse and inconspicuous, rather noticeable on the apex of the first dorsal segment. Length, 4 mm.

Head large, subquadrate, long and broad behind the eyes, closely but shallowly punctate; ocelli small, about .05 mm. in diameter, the posterior pair .26 mm. from each other and .40 mm. from the eyes; a blunt compressed spine on the face between the antennae; anterior edge of clypeus prominently margined. First segment of the flagellum broader than long, equal to the pedicel, shorter than the second.

Outline of thorax rectangular, with a sharp incision at the metathoracic spiracles; the humeral angles sharp; the postero-lateral angles dentate; side pieces of pronotum punctate, merging into striate; pleura mostly impunctate and polished, in one place punctate; caudal aspect of propodeum truncate above, sloping below, smooth and polished, margined superiorly with a semi-circle of nine flattened teeth.

Petiole with its apical part rough, ventrally with a sharp keel which is weakly notched, second segment regularly, moderately strongly, and closely punctate; pygidium rather closely punctulate at base.

Type.—NEW YORK, [American Entomological Society].

Myrmosa (**Myrmosa**) *species non descripta*

A single male from Exeter, California, collected by the writer, July 30, 1907, represents an undescribed species. As the specimen has lost its head, I refrain from describing it, but have compared it with *unicolor* in the above short key, for the information of those who may be so fortunate as to find additional specimens in the field or amongst the material already in their collections.

A KEY TO THE SPECIES OF THE SUBGENUS MYRMOSULA

Insect black, at most with the tip of the abdomen reddish; cell R_4 narrowed above, higher than long.....**parvula** Fox
Head, thorax, and legs black, abdomen ferruginous; cell R_4 quadrate, longer than high.....**rufiventris** Blake

Myrmosa (Myrmosula) parvula Fox, ♂.

GEORGIA: Atlanta, August 2, 1913, 1 ♂, (the author), [Cornell University].
ILLINOIS. MONTANA.

Myrmosa rufiventris Blake, ♂.

NEVADA.

BRACHYCISTIS Fox

A study of the males of the genus *Brachycistis* reveals the existence of numerous unsuspected, and in some cases very well marked, characters for the separation of many of the species. The best of these characters are to be found in the genitalia, and especially is this true of the group of species allied to *castanea*, in which the genital characters are very strongly marked. Externally visible and striking differences led me to make dissections of these organs in most of our species, with fortunate results, although in the major series of species there is quite a uniformity of structure. It is in these species that other structures are in general more monotonous, and good structural specific characters that can be readily formulated, difficult to find, while in those with the striking genitalic differences, correspondingly strong peculiarities of other structures are frequent. In other words the latter doubtless represent well established, distinct and stable species, while the former represents the greater mass of evolutionarily more active, plastic, and less firmly established species. It is not surprising in such forms to find a lack of stability, even in characters that in the former group seem to be entirely fixed and thoroughly dependable for denoting specific limits.

The purpose of the present task has been to study the types of the existing species, with a view to establishing characters that would make their specific differentiation definite, and to describe and include such additional species as are represented in the material before me. From the previously existing keys it is not possible to identify some of the type specimens themselves, and I believe considerable confusion and misidentification must have resulted from their use. Interesting as the task would be, the limits of time have not permitted an attempt to study the large amount of material of this genus that must exist in the various collections in this country, nor has any special attempt been

made to collect material. Thus the present paper can be looked upon only as affording what I trust will prove a firm foundation for a knowledge of the genus, and as neither exhaustive, nor in any sense complete.

It is probable that there exist in the southwest very many species of this genus that remain unknown, and that the distribution of many, if not most of the species is decidedly restricted. Therefore, in order to prevent confusion in the future, it has seemed to me all the more important to review at this time our existing species from type material, and to establish more fully their specific characteristics. In drawing up the descriptions of the new species I have followed throughout one form, which includes only characters that have proved to differ in different species. Of course some of these characters will vary within the limits of certain species and remain constant in others, and there are series of species alike in certain characters which differ in only a few, but I think it would not be presumptuous to suggest that future describers of species within this genus should not omit any of the characters mentioned in, let us say, the description of *B. crassa* below.

The meagerness of our actual knowledge of *Brachycistis* is shown by the fact that as yet we do not know with certainty a single female. The two species included by Fox tentatively in this genus, although without any conviction that they really belonged there, I shall leave there, for lack of definite evidence to the contrary. However, there are two reasons, besides the one mentioned by Fox, why I do not believe that they can belong to *Brachycistis*. The first is that while one of these species was described from Missouri, and I have since seen specimens in the collection of Mr. Nathan Banks from Virginia, males of *Brachycistis* are not known from east of the Mississippi River. It is hardly probable that the tolerably common and easily collected winged males, flying as they do to light in numbers, would be entirely overlooked by our eastern collectors, while only the females which must be very rare, or at least by their obscure habits difficult to collect, found. The other reason is that the females described as *B. rutilans* and *B. bimaculatus* possess a peculiar leaflike expansion of the posterior coxae, which does not occur in the males, but which does occur in both the males and

females of *Myrmosa*. As to what these females really are, I can only suggest that they may represent the female sex of those species heretofore included in the genus *Myrmosa*, but for which is established in this paper the subgenus *Myrmosula*, or, more probably, a genus of which the males are as yet entirely unknown.

The females to which reference has just been made have been suspected by Ashmead of belonging to the genus *Milluta* of André. That genus was based on a palearctic species unknown to me, and may have valid claims for recognition on the basis of other characters than those stated. Although some of our species possess the chief characters on which this genus is said to be based, I can not believe that they form by themselves a section worthy of generic or even subgeneric rank. However, none of them possess toothed tarsal claws, as in *Milluta*, and I believe the latter genus will have to be restricted to the palearctic species on the basis of this distinction, and possibly others, perhaps in the genitalia, as yet unknown.

The Characters of the Males of *Brachycistis*

Most frequent color brownish orange to castaneous, or mahogany red, often with the head black and sometimes wholly black; other colors not known. Wings hyaline or slightly infuscated beyond the stigma. Length from 6 to 20 mm. The colors seem quite constant specifically, the black on the thorax, however, sometimes varying to dark red. They are clothed with sparse, erect, usually yellowish pubescence, thickest on the pronotum, caudal face of the propodeum, sides of the petiole, and abdominal segments, where it is arranged in sinuous, closely set, transverse rows, one on each segment.

The head is transverse, more or less narrowed behind the eyes, which are very large, bead-like, round, and reach the mandibles. Ocelli usually large and prominent, but sometimes small and not prominent. Their size and distance from the eyes and from each other afford very important specific characters. Under the specific description the measurements of the ocelli are given in the following order: narrowest diameter of the posterior ocelli, distance from the eyes, distance from each other. The anterior ocellus is transverse, and often larger than the others; the posterior are somewhat obliquely placed, and by reason of being

inserted on the lateral slope of a raised prominence of the vertex, they face nearly laterad rather than dorsad, in most but not all species. The forehead is sometimes raised medially above the antennae, again flat, and often armed with a transverse row of four tubercles, the two lateral sometimes developed into carinae. The inferior border of each antennal socket is sometimes thickened, and produced ventrally into a triangular tubercle, or into a flattened curved ridge. The anterior margin of the clypeus is of varying form, most frequently emarginate. The mandibles are robust, strongly curved, with three teeth, of which the apical is the longest. From the inner tooth a carina extends toward the base of the mandible, usually in a broad curve, its length and shape varying in the species. In three it is elevated into a tooth close to the base. The width of the gular orifice varies in different species, and in some it is laterally immargined, in others margined, and the margins sometimes produced into prominent reflexed processes. The maxillary palpi are six-segmented and the labial four. The first three segments of the latter are sometimes widened and triangular. The antennae are filiform, usually crenulated, sometimes very strongly so, as in *stygia*, sometimes not noticeably so; occasionally the segments are much elongated. I have not noted much variation in their proportions. The scape is short, globose and punctate, the pedicel very short, hardly half as long as wide; the third segment about one and one-half times as long as the scape and equal in length to the fourth. The surface of the head is always polished and always with sparse, usually very sparse and small punctures, sometimes moderately coarse and less sparse.

The humeral angles are sometimes prominent, more often not in evidence, being entirely rounded. The mesonotum always has well marked parapsidal furrows, and is frequently much depressed before the scutellum. Its surface is most often sparsely, rarely rather densely punctured. The scutellum is subquadrate, only slightly convex, its disc usually with sparse punctures, and its sides, like those of the post-scutellum, often with minute close punctulations. The mesopleura are always strongly convex, and in many species marked with peculiar rugosities, sometimes with an impressed basin which may be surrounded by a rim or tubercles, while often there is a deep pit near the upper

posterior border. The middle coxae are each covered at base with a scale-like projection of the mesosternum, and there is a similar, thicker projection of the metasternum at the base of each posterior coxa, differing slightly in form in different species. The propodeum usually has definite dorsal, caudal and lateral faces, the two former separated in some groups of species by a strong transverse carina, an important specific character. In rare cases the propodeum is very low, entirely rounded, and without definite faces; sometimes the hind angles are prominent and punctured or rugose, but are usually rounded and only slightly roughened. The dorsal face is generally polished, without sculpture, or with a median channel; the posterior face is roughened by the insertion of numerous erect hairs, as are also the upper parts of the sides. The dorsal face is usually strongly declivous.

The wings present important specific characters. They all agree in having the venation terminate not more than two-thirds of the way from base to apex, the rest being free membrane (figures 5 to 20). The length of the stigma, and the length and shape of the marginal cell ($2dR_1 + R_2$) are variable among the different species, in fact the former has been made a chief character for distinguishing André's genus *Milluta* from *Brachycistis* (compare figures 20, 12, 8 and 11). The cell R_4 is in rare cases not enclosed (figures 9 and 20). Its height as compared with its length must be used specifically with caution, as it is somewhat variable. The cell R_5 is usually short and triangular, but in a large group of species elongate, by reason of the radio-medial cross-vein ($r-m$) being inserted on media (M) close to the medio-cubital cross-vein ($m-cu$), (compare figures 5, 19 and 20, with 6 to 10). In one or two species in this group the position of $r-m$, while always close to $m-cu$, varies from apicad to basad thereof, while in others it is more stable. In a few species the radial cross-vein is apicad of R_5 , and therefore the cell R_5 is "petiolate" and very small (figures 19 and 20). Other features of the wings will be apparent from the illustrations.

The armament of the legs is of importance for specific differentiation. The tibiae and tarsi are closely pubescent. In some species the anterior metatarsi are armed with a row of three or four spines on the posterior border and two on the inner surface,

the outer surface of the middle tibiae with a group of spines, and the posterior border of the hind tibiae with a row of a few spines, or any or all of these may be wanting. The claws are simple and slender.

The length of the first abdominal segment, whether it is constricted from or dorsally sessile with the second, whether it has an anterior narrow portion or neck, or whether it is enlarged directly from the base, are all matters of great importance in the differentiation of species. Sometimes it forms a long petiole, varying from slightly to strongly nodose, while again it may be short and not at all petioliform. Its sides are either coarsely punctured, or simply roughened by the insertion of numerous upright hairs. In giving measurements of this segment I have taken its length along the ridge or carina at its side, and its greatest dorso-ventral thickness as seen from a strictly lateral view. The second ventral segment is usually more or less evenly convex, but in one species is truncate basally, with the truncate portion separated by an undulating, transverse carina. In a few species there is a short, median, basal, longitudinal keel on this segment. The setae of the second to sixth abdominal segments inclusive are almost invariably grouped into a sinuous or V-shaped closely-set row on each segment, as a rule about two-thirds of the way from the base to the apex, arising from well marked small punctures, while there are only very few scattered over the rest of the surface. In one or two species, as notably *stygia*, these rows become indistinct, or at places altogether lost in a mass of setigerous punctures scattered over the abdomen. The pygidium is narrow and notched, truncate or obtuse at tip, with or without lateral margins, sometimes with a raised, median, longitudinal, impunctate, polished strip, and with a varying number of coarse, setigerous, lateral punctures.

I am not certain of the homologies of some of the parts of the genitalia and use the terminology only tentatively, endeavoring to make it correspond with that used by Dr. Franklin for the Bombidae.³ The uncus is an unpaired median organ, varying greatly in shape in the different species, sometimes with a V-

³Franklin, Henry J. The Bombidae of the New World. Transactions of the American Entomological Society. 1912. 38: 177-486. 1913. 39: 73-200. 22 pl.

shaped or square notch at tip (figures 36 and 47), and in one species (*crassa*) with the entire apical portion bent sharply upwards and bifid (figures 21 and 22, A). The sagittae are in the mass of species blade-like, slender, and nearly as long as the uncus (figures 39, 40, and 43 to 49, C), but in those of the *castanea* group are short and of various forms (figures 21 to 30, C), in one case (*stygia*) with their apices much thickened, tricuspid and truncate (figure 25, C). What I suppose represent the volsellae are always reduced to a pair of small chitinous buttons at the base of and just exterior to the sagittae (figures 21 to 31 and 40, D). The rami are roughly quadrate pieces (figure 21, E), bearing the long hirsute squamae (figure 21, B). Their upper posterior angle, as seen from the side, is sometimes acutely produced (figure 34), sometimes rounded and rolled inward or recessive (figure 48). A piece on either side attached both to the lower part of the ramus and the base of the sagitta within, I have termed the inner side of the ramus. It usually bears a brush of bristles. The squamae are long or short, pointed at tip, and sometimes with a distinctly differentiated posterior margin (compare figures 35 and 39), which in three species is deeply notched (figures 21, 24 and 27). This notch is usually apparent externally without dissection.

The genitalia of the Mutillidae are of a very different type from those of *Brachycistis*, especially as concerns the uncus, which in the former, if I am correct in my correlation of parts, is a paired organ, the penis-zapfen of Zander or crochets of Radoszkowski. The probable correspondence of the terms used by the latter author for Mutillidae,⁴ with those used in this paper for *Brachycistis* are indicated in the explanation of the plates on page 289.

Type of the genus: *Brachycistis petiolatus* Fox, by designation of Ashmead, 1903.

A KEY TO THE SUBGENERA OF BRACHYCISTIS

Forewings with three submarginal and three discoidal cells (figure 5), or in one species with two submarginal and two discoidal cells (figure 20).

Brachycistis Fox

Forewings with only one submarginal and two discoidal cells (figure 50).

Brachycistellus Baker

⁴Revision des armures copulatrices des mâles de la famille de Mutillides. Par le Général Radoszkowski. Horae Societas entomologica Rossicae. 1885. 19: 3-44. pl. I-IX.

Subgenus **Brachycistis** FoxA KEY TO THE SPECIES OF THE SUBGENUS BRACHYCISTIS KNOWN
TO OCCUR IN AMERICA NORTH OF MEXICO*Males*

1. Fore-wing with cell R_4 enclosed, therefore 3 submarginals present (figures 9 and 20). (4)
Fore-wings with R_4 not enclosed, therefore only two submarginals present (figure 5). (2)
 2. Occiput not separated from the vertex by a carina; ocelli small, the diameter of the posterior pair equal to one-third of their distance from the compound eyes; cell $2d R_1 + R_2$ very small, linear, ending before the apex of the stigma (figure 20). **perpunctata** Cockerell
Occiput separated from the vertex by a carina; ocelli large, the diameter of the posterior pair equal to their distance from the compound eyes; cell $2d R_1 + R_2$ small but not linear, ending at or slightly beyond the apex of the stigma (figure 9). (3)
 3. Lateral angles of the propodeum rounded, not prominent, evenly, not rugosely punctured; r-m inserted closely apicad of m-cu, or sometimes opposite or even basad thereof (figure 9). **eremi** new species
Lateral angles of the propodeum prominent, somewhat angular, rugose, in part reticulate; r-m usually inserted about midway between m-cu and $M_3 + 4$, sometimes nearer the latter, and sometimes nearer the former, but rarely close to m-cu and never opposite or basad thereof.
- brevis** Fox
4. Front wing with r-m inserted on M close to m-cu, the cell R_5 therefore elongate (figures 7 and 10); abdomen sessile. (5)
Front wing with r-m inserted on M close to $M_3 + 4$, the cell R_5 short and triangular (figure 5). (8)
 5. Posterior margin of the squama deeply notched, so that it is somewhat biramose (figure 24). (6)
Posterior margin of the squama entire (figure 31).
- thermarum** new species
6. Coal black, with white pubescence; the diameter of the posterior ocelli approximately equal to one-half of their distance from the compound eyes **stygia** new species
Castaneous; the diameter of the posterior ocelli equal to their distance from the compound eyes. (7)
 7. Second ventral segment without a transverse ridge; pygidium bounded by sharp lateral carinae and with a raised median longitudinal fold, the interstices considerably depressed; lower margin of the antennal socket simple; squama acute; uncus neither recurved not bifid (figure 27).
- castanea** (Cresson)

Second ventral segment near its base with a well-defined undulating transverse ridge; pygidium with its lateral margins poorly defined, the median area very indefinitely raised; lower margin of each antennal socket armed with a tubercle projecting ventrad; squama obtuse; apical portion of uncus bent backwards and notched at apex (figures 21 and 22).

crassa new species

8. Propodeum with a strong transverse carina separating the dorsal from the caudal surface. (9)

Propodeum without a transverse carina. (12)

9. Distance from the apex of the cell $2d R_1 + R_2$ to the apex of the stigma .7 the length of the stigma or more (figure 11)..... (10)

Distance from the apex of the cell $2d R_1 + R_2$ to the apex of the stigma .3 the length of the stigma (figure 5); greatest dorso-ventral thickness of the petiole .4 of its length; second ventral segment simple.

carinata Fox

10. Petiole with a long slender anterior neck, but little swollen toward the apex, its length three times its greatest dorso-ventral thickness; second ventral segment with a mere trace of a longitudinal carina at its base.

idiotes Cockerell

First abdominal segment short, thick, not anteriorly produced into a neck, half as long again as its greatest dorso-ventral thickness; second ventral segment with a sharp longitudinal carina at its base. (11)

11. Clypeus evenly rounded, the margin elevated; mesopleura each with a poorly marked rugosity, but not as in the following species; the distance from the end of the stigma to the apex of the marginal cell .8 the length of the stigma. **aequalis** Fox

Clypeus with its median portion produced and truncate, not elevated; mesopleura each with a large impressed basin, surrounded by rugae and posteriorly by a carina; the distance from the end of the stigma to the apex of the marginal cell equal to the length of the stigma (figure 11).

noctivaga new species

12. Cell R_5 minute and far remote from the base of the cell $2d R_1 + R_2$; the vein R_4 but slightly apicad of the radial cross-vein, far basad of the apex of the cell $2d R_1 + R_2$. Small species, 6 to 8 mm. in length; middle of clypeus with a tubercle (except possibly in *gaudii*)..... (13)

Cell R_5 larger, triangular and reaching to or nearly to the base of $2d R_1 + R_2$; the vein R_4 far apicad of the radial cross-vein. (16)

13. Propodeum rugose or smooth, not lineolate; color never black. (14)

Propodeum transversely minutely lineolate. Color black.

gaudii Cockerell

14. Propodeum without sculpture, other than a median basal groove, its lateral angles rounded; thorax honey yellow, head and abdomen darker. Length, 6 mm. (New Mexico)..... (15)

Propodeum with the sides of the dorsal surface and the postero-lateral angles rugose; mandible with three teeth, a strong carina reaching the inner tooth; rather uniformly dark castaneous. Length, 8 mm. (Lower California). **petiolata** Fox

15. Transverse diameter of posterior ocelli about one-third greater than their distance from the eyes.....**elegantula** Cockerell and Casad
Transverse diameter of the posterior ocelli equal to their distance from the eyes.**indiscreta** Fox
16. First abdominal segment petiolate, long and slender, the anterior linear portion longer than the slightly swollen posterior portion; propodeum abnormally long and low, without sculpture and without boundary between its dorsal, posterior, and lateral faces. Large and slender species. (17)
First abdominal segment petiolate or sessile, but comparatively short, the anterior narrowed portion always shorter than the strongly swollen posterior part, often very short. Species usually smaller and more robust. (18)
17. Head .4 wider than minimum distance between the tegulae; petiole, viewed from the side, evenly and but slightly enlarged posteriorly, four times as long as its greatest dorso-ventral thickness; mandible without a carina on the upper surface at base; R_5 not meeting $r-m$ at an angle, the cell R_5 therefore triangular; color dark castaneous. Length, 20 mm.
protracta new species
Head one-tenth wider than minimum distance between the tegulae; petiole suddenly widened toward its apex, three and one-half times as long (measured along the side) as its greatest dorso-ventral thickness; each mandible with a strong carina along its upper surface arched into a tooth near its base; R_5 meeting $r-m$ at an angle, the cell R_5 therefore four-sided; color brownish yellow. Length, 14 mm.....**ampla** (Blake)
18. Posterior tibia with a row of from two to five stout spines along the posterior edge; middle tibia with a group of stout subapical spines on the outer surface. Length, 14 mm.....(19)
Posterior tibia unarmed; middle tibia with spines fewer and inconspicuous or wanting. (21)
19. Diameter of the posterior ocelli one-third greater than their distance from the eyes; longer posterior tarsal spur two-thirds as long as the metatarsus. Color castaneous, head a little darker.....**alcanor** (Blake)
Diameter of the posterior ocelli not exceeding their distance from the compound eyes; longer posterior tarsal spur one-half as long as the metatarsus. (20)
20. Head black; sagittae slender and pointed...**ioachinensis** new species
Head concolorous; sagittae thick and blunt.....**nitida** (Cresson)
21. Basal abdominal segment dorsally not at all constricted from the second, laterally scarcely or not at all so, short, thickened, and without anterior neck; color brownish orange or castaneous with the head darker or black.
(22)
Basal abdominal segment strongly constricted dorsally and laterally from the second, short or long, with or without an anterior neck; size and color various. (23)

22. Anterior metatarsus with a row of three erect spines on the posterior border, and two smaller ones on the inner surface; diameter of the posterior ocelli 1.8 times as great as their distance from the eyes. Length, 12 mm. **erlomis** new species
 Anterior metatarsus without erect spines along the edge, two small ones on the posterior surface; diameter of the posterior ocelli 1.2 times as great as their distance from the eyes; sagittae short, thick and blunt (figures 41 and 42). Length, 8 mm. **arenivaga** new species
23. Ocelli small and not prominent, the transverse diameter of the hind pair scarcely more than equal to one-half their distance from the eyes, and approximately equal to their distance from the front ocellus; carina of the mandible with an angular elevation at base. Color black. Length, 8 mm., slender. **micrommata** new species
 Ocelli larger, prominent, sometimes very large, the transverse diameter of the posterior pair but little less than their distance from the eyes, usually equal to or greater than the same, and equal to at least twice their distance from the anterior ocellus. (24)
24. Head and body black, or, if the thorax is red or reddish, at least the legs are fuscous; stigma black; petiole longer, with its neck longer and more slender than in the following. (25)
 Color brownish orange to castaneous. The abdomen and thorax are both always castaneous or yellowish, and if the head is black the legs are testaceous or reddish, not fuscous; stigma sometimes brown, more often yellow; petiole with a short neck or none at all. (26)
25. Small slender species, entirely black. Length, 8 mm. **atrata** (Blake)
 Larger species, less slender, usually with more or less dark red on the thorax, sometimes entirely black. Length, 10 mm. **nuda** Fox
26. Width of the petiole at its apex equal to its lateral length, its thickness from two-thirds to three-fourths thereof. (29)
 Width of the petiole at its apex from .6 to .8 of its lateral length, its thickness from one-half to three-fifths thereof. (27)
27. Ocelli small, the transverse diameter of the posterior pair less than their distance from the eyes. (28)
 Ocelli large, their transverse diameter nearly one-half again as great as their distance from the eyes; color brownish orange. Length, 10 mm.; stout. **nevadensis** Fox
28. Carina on the mandible not reaching more than half way to the base; width of the petiole .8 of its lateral length, its thickness .6 thereof; color brownish orange. Length, 10 mm. **subquadrata** Fox
 Carina on the mandible reaching the base where it is strongly and angularly elevated; width of the petiole .6 of its lateral length, its thickness less than .5 thereof; reddish castaneous; head black. Length, 8 mm., slender. **dentata** new species
29. Edge of the clypeus preceded by a transverse lamina or tubercle. (30)
 Margin of the clypeus emarginate, not thickened, but the apical portion of the clypeus prominent, without a transverse lamina or tubercle; entirely brownish orange, stigma concolorous. **inaequalis** Fox

30. Head black; tubercle on the clypeus strongly transverse.

glabrella Cresson

Head concolorous; tubercle on the clypeus less transverse and more elevated..... **triangularis** Fox

Females

Front with a strong median biramose prominence above the base of the antennae; dark castaneous. Length, 6 mm..... **B. rutilans** (Blake)

Front with a moderate process on either side, immediately above the base of each antennae, the two not confluent; testaceous. Length, 4 mm.

B. bimaculata Fox

Brachycistis (Brachycistis) atrata (Blake), ♂.

1899. *Brachycistis contiguus* Fox, Trans. Amer. Ent. Soc., 25: 282, ♂.

This species is very closely allied to the following, indeed doubtfully distinct from it. The abdomen of the type of *atrata* has been replaced by an abdomen belonging to a male *Mutilla*, that has furnished the characters by which Fox distinguishes the species in his key.

NEVADA: [*Types* of *atrata* and of *contiguus*, American Entomological Society]. CALIFORNIA: Claremont, 1♂, (C. F. Baker), [Cornell University].

Brachycistis (Brachycistis) nuda Fox, ♂.

1899. *Brachycistis nigrilus* Fox, Trans. Amer. Ent. Soc., 25: 282, ♂.

Genitalia: Sagitta long, narrow, and acute; volsella reduced to a small scale; ramus without prominent angles; squama long and slender, with entire margin; uncus as seen from the side arched and somewhat thickened medially, from above strongly widened toward the apex, which is acutely notched.

The absence of pubescence described as characterising this species, and from which it takes its name, is due to artificial denudation. The genitalia are described from a specimen from Claremont, California.

CALIFORNIA: [*Type* of *nudus*, American Entomological Society]; Claremont, 2♂, (C. F. Baker), [Pomona College and Cornell University]; Laguna Beach, 1♂, (C. F. Baker), [Pomona College]. WASHINGTON: [*Type* of *nigrilus*, American Entomological Society]. NEVADA: [*Type* of *nigrilus*, American Entomological Society].

Brachycistis (Brachycistis) dentata new species

♂. Head black; thorax strongly reddish castaneous; abdomen castaneous; legs testaceous, the posterior femora brown; antennae brownish orange; sparsely yellowish pubescent; wings hyaline, the stigma fuscous brown, the veins pale to dark fuscous. Length, 8 mm.

Head polished, with very few small punctures; ocelli moderately large and prominent, with a transverse impressed line behind but none between them; their measurements:⁵ .21 mm., .26 mm., .36 mm.; front slightly convex, with even surface, neither tuberculate nor carinate; inferior margin of each antennal socket somewhat thickened, but without a tubercle; clypeus raised to a sharp, median, apical point, the apex rather narrowly emarginate, with distinct but not sharp lateral angles; mandible with large teeth, a strong carina extending basad from the inner one, strongly angularly elevated just before the base of the mandible; gular orifice wide, its lateral margins strongly produced and reflexed, distant from the eyes by about the length of the last segment of the labial palpus or a little less, and by distinctly less than the diameter of the swelling at the base of the mandibles. Antennae not crenulate.

Humeral angles not evident; pronotum medially rugulose, laterally sparsely punctured, almost impunctate on the lower part; mesonotum anteriorly with more than the usual number of small setigerous punctures, posteriorly almost impunctate, polished; scutellum polished, with few dorsal punctures and numerous minute lateral punctulations; post-scutellum with three or four dorsal punctures and a few lateral punctulations; mesopleura polished, with scattered punctures, which become obsolete ventrally and posteriorly, the surface strongly convex but not irregular, with a pit near the posterior margin; propodeum dorsally neither sculptured nor polished, without a transverse apical carina, the hind angles rounded, not prominent, the posterior face strongly declivous, roughened by the insertion of numerous hairs, as are also the upper parts of the sides.

Wings as shown in figure 18.

The anterior metatarsi and the middle and posterior tibiae are without the noticeable spines found in some species.

Petiole rather strongly nodose, constricted from the second segment, moderately long, with a distinct anterior neck, its sides roughened by the insertion of numerous erect hairs; pygidium notched, immargined, with a few poorly defined lateral punctures.

Sagitta slender, and tapered, its apex bent upward; volsella reduced to a scarcely noticeable button; superior hind angles of the ramus rounded, receding; inner side of the ramus with a brush of setae; squama rather short and thick; uncus as seen from the side widening to the apex, from above strongly compressed, without a flaring apical portion, the apex not notched (figure 45).

Type.—Jemez Springs, New Mexico, May 29, 1913, (Mr. John Woodgate), [Cornell University, No. 117.1].

Brachycistis (Brachycistis) triangularis Fox, ♂.

Genitalia: Sagitta long, slender and blade-like, ending a little before the tip of the uncus; volsella reduced to small chitinated button; squama rather stout, its posterior margin entire; uncus slender, slightly widened before and notched at the tip, somewhat decurved (figures 46 and 47).

⁵Given always in the following order: narrower diameter of the posterior ocelli, their distance from the compound eyes, their distance from each other.

Description and figures drawn from a paratype in the collection of the American Entomological Society.

ARIZONA: [*Type*, American Entomological Society].

Brachycistis glabrella (Cresson), ♂.

Brachycistis alcanor (Blake) is not a synonym of this species, as has been previously supposed.

COLORADO: [*Type*, American Entomological Society, No. 1893].

Brachycistis subquadrata Fox, ♂.

CALIFORNIA: [*Type*, American Entomological Society].

Brachycistis (Brachycistis) micrommata new species

♂. Black, the tarsi and antennae brown, the latter dark except at base; sparsely clothed with somewhat yellowish pile; wings hyaline, slightly infuscated beyond the stigma, which is piceous; veins brownish yellow to piceous. Length, 8 mm., slender.

Head polished, with few small punctures; ocelli small, not prominent and widely separated, the portion of the vertex on which they are situated not strongly elevated, as is usual, a weak transverse depression behind and a longitudinal one between them; measurements: .17 mm., .3 mm., .38 mm.; forehead with even, slightly convex surface, neither ridged nor tuberculate; inferior margin of each antennal socket thickened, with a downward projecting triangular tubercle; clypeus polished, somewhat depressed, with a raised median marginal point, the apex emarginate with a tooth on either side; apex of mandibles wide, the two inner teeth of equal size, rather large, a strong carina extending from the inner to the condyle, just before which it is strongly but not angularly elevated; antennae slightly crenulate at apex.

Humeral angles not evident, entirely rounded; pronotum with sparse small punctures; mesonotum polished, with very few small punctures, the lateral grooves well marked; scutellum convex, its disc polished, with very few small punctures, its sides with a few minute punctulations; disc of post-scutellum polished, with one or two punctures, the sides without the usual punctulation; mesopleura strongly convex, the surface uniform, with scattered rather coarse punctures, the lower posterior part entirely impunctate and shining; propodeum with a weak median depression, the dorsal surface otherwise impunctate, without a transverse apical carina, the lateral angles rounded, the posterior face strongly declivous, roughened by the insertion of numerous erect hairs as are also the superior parts of the lateral faces.

Wings as shown in figure 15.

Anterior metatarsus without spines; middle tibia without a group of spines on its outer surface, one or two present but so reduced as to be hidden and entirely inconspicuous; posterior tibia unarmed.

Petiole strongly nodose, with a short but distinct anterior neck, dorsally constricted from the second segment, laterally roughened by the insertion of upright hairs; pygidium obtuse, with two or three coarse basal punctures on each side, a weak median elevation and weakly margined laterally.

Type.—Berkeley, California, June 30, 1898, [Cornell University, No. 118.1].

Brachycistis (Brachycistis) nevadensis Fox, ♂.

Genitalia: Sagitta long, slender, blade-like and curved; volsella an inconspicuous scale; squama with an entire apical margin; uncus from a dorsal view slightly and gradually thickened toward the apex, bearing a wide apical notch, from a lateral view rather strongly thickened before the apex and decurved (figure 43).

Described and figured from the type specimen.

NEVADA: [*Type*, American Entomological Society].

Brachycistis (Brachycistis) inaequalis Fox, ♂.

Genitalia: Sagitta long, slender, blade-like, curved, ending very little before the tip of the uncus; volsella reduced to a minute scale; squama rather slender, its lateral margin merging gradually into the posterior, which is not notched; uncus from a dorsal view slightly widened toward the tip, which bears a wide and deep semicircular notch, from a lateral view rather strongly thickened before the apex, decurved (figure 49)..

Description and figure drawn from a paratype in the collection of the American Entomological Society.

CALIFORNIA: LOS Angeles, September, [*Type*, United States National Museum, *paratypes*, American Entomological Society].

Brachycistis (Brachycistis) erioptis new species

♂. Mahogany red, the head much darker, the antennae and legs yellow; clothed with sparse, erect, yellowish pubescence; wings hyaline, faintly clouded toward the apex; veins yellow to brown, Sc + R + M dark brown, the stigma golden yellow. Length, 12 mm., stout.

Head with few minute punctures; ocelli very large and prominent, a transverse rugosity behind them, a deep transverse impressed line immediately behind and a longitudinal one between them, measurements: .38 mm., .28 mm., .5 mm.; four inconspicuous raised points above the base of the antennae, the lateral ones transverse; inferior border of each antennal socket inferiorly incrassate; clypeus slightly convex, shallowly emarginate, the edge not thickened; mandible with inner two teeth equal, short and blunt, an elevated curved carina extending half-way to the base; gular orifice narrow, its barely margined edge distant from the eye by considerably more than the length of the last segment of the labial palpi, and from the swelling at the condyle of the mandibles by about twice the thickness of the same. Antenna crenulate; basal segment of the flagellum somewhat curved, a little more than twice as long (.68 mm.) as thick (.28 mm.).

Humeral angles entirely rounded, indistinct; pronotum with only sparse and small setigerous punctures; mesonotum polished, bearing minute irregularly scattered punctures and distinct lateral grooves, deeply depressed in front of the scutellum; the latter convex, with a few small punctures; postscutellum

medially convex and impunctate, laterally with some minute punctulations; mesopleura swollen, but not irregularly, the surface polished, with sparse small punctures, a pit anterior to the upper posterior edge; dorsal face of the propodeum polished, impunctate, without sculpture, not separated from the posterior by a carina, lateral angles prominent but entirely rounded, lateral face, except above, polished and impunctate, its upper parts and posterior face roughened by the insertion of numerous hairs.

Wings as shown in figure 14. The spur extending basad from m-cu is undoubtedly abnormal.

Anterior metatarsus with four slender spines along the posterior inner margin and two on the outer; middle tibia with a small group of inconspicuous spines on the apical part of the outer surface; posterior tibia without spines on the hind margin.

Abdomen sessile, the first segment short, thick, and enlarging directly from the base, without anterior neck; its sides with the basal and lateral parts of the dorsal surface roughened by the insertion of numerous hairs, the rest of the abdomen polished, with only small setigerous punctures, more or less gathered into transverse rows; the second ventral segment not carinate.

Type.—Calexico, Imperial County, California, August 11, 1914, (the author), [Cornell University, No. 119.1].

This species is closely allied to *nitida* and *ioachinensis*.

Brachycistis (Brachycistis) nitida (Cresson), ♂.

Genitalia: Sagitta strongly compressed, blade-like, but of considerable width dorso-ventrally, obtuse, of moderate length, and with the apical portion somewhat deflexed; the volsella forms a comparatively large chitinous button; upper posterior angle of the ramus bluntly rectangular, its inner surface with a patch of erect, stiff bristles; squama rather short and broad, its tip mucronate; uncus as seen from the side strongly arched, narrowed in the middle and much widened before the apex, from above it appears long and slender, the apical third widened, and the apex with a deep, almost rectilateral notch.

The description of the genitalia is drawn from a specimen from Arizona in the collection of Cornell University.

COLORADO: [*Type*, American Entomological Society No. 1892]. NEW MEXICO: [American Entomological Society]. ARIZONA: Nogales, July 10, 1903, 1 ♂, (E. J. Osler), [Cornell University].

Brachycistis alcanor (Blake), ♂.

This species has been incorrectly considered a synonym of *glabrella*.

ARIZONA: [*Type*, American Entomological Society].

Brachycistis (Brachycistis) ioachinensis new species

♂. Brownish orange, the head black, the antennae and legs yellowish; clothed with sparse yellowish hairs; wings hyaline, the veins yellow to brown; Sc + R + M and the stigma dark brown. Length, 12 to 14 mm.

Head shining, with a few small punctures; ocelli very large and prominent, without a transverse impression behind and only a faint longitudinal impression between them, measurements: .4 mm., .25 mm., .53 mm.; forehead with a row of four small tubercles above the antennae, the two inner sharp and tooth-like, the two outer slightly transversely elongated; inferior margin of the antennal sockets with a downward projecting thickened fold; edge of the clypeus emarginate, thickened, and sloping; the surface above it strongly elevated; mandible with the inner two teeth of equal size, a strong curved carina extending from the innermost about half way to the base; gular orifice broad, its slightly reflexed lateral margin distant from the eye by about the length of the last segment of the labial palpi, and from the swelling at the base of the mandibles by considerably less than the thickness of the same; antennae not or scarcely crenulate.

Humeral angles rounded and indistinct; pronotum dorsally sparsely punctured, still more sparsely on the sides; mesonotum polished, shining, bearing very sparse small punctures and distinct lateral grooves which are rather deeply depressed in front of the scutellum; the latter convex, its disc with sparse punctures, its sides with minute punctulation; postscutellum sub-tuberculate, medially impunctate, laterally bearing small punctures and some minute punctulation; mesopleura swollen but not irregularly nor rugosely so, sparsely punctured, the punctures smaller and much sparser posteriorly and on the sternum; each mesopleurum bears a small pit anterior to the upper part of the posterior border; dorsal surface of the propodeum polished, impunctate, and without sculpture, not separated by a carina from the strongly declivous posterior face; the lateral faces, except above, polished and impunctate, the posterior and upper part of the lateral faces roughened by reason of bearing erect hairs.

Wing venation as shown in figure 13.

Anterior metatarsus with two short spines on its inner surface; middle tibia with a group of stout subapical spines on its outer surface; posterior tibia with a row of about four stout spines on its posterior margin.

First abdominal segment moderately short, not much thickened posteriorly, with a distinct but short anterior neck, its sides considerably roughened by the insertion of numerous hairs; second ventral segment without carinae; surface of abdomen polished and with only minute setigerous punctures; pygidium narrowed and truncate posteriorly, with indistinctly margined sides, a slightly raised, median, smooth fold, and a few coarse lateral punctures.

Sagitta long, slender, tapered and turned upward toward the apex; volsella reduced to a very small chitinous button; ramus with its posterior upper angles not produced, turned inward; the inner surface of the ramus with a brush of hairs; squama rather slender, bluntly tapering, without a differentiated or notched posterior border; uncus as seen from the side arched downward, from above strongly compressed, flaring into an oval head at apex, the tip deeply and squarely notched.

Type material.—Holotype: Coalinga, Fresno County, California, below 500 ft. elevation, June 1-3, 1907, (the author),

[Cornell University, No. 120.1]. Three paratopotypes, same date. Two paratypes from the Jacintas Barranca in the Kettleman Plains, Fresno County, California, June 4, 1907. As this locality is within a few miles of Coalinga the two latter are also to all purposes paratopotypes. [Cornell University, Nos. 120.2 to 120.6.]

The description of the genitalia is from a paratype.

This species finds its closest relatives in *nitidus* and *eriopis*, from which it is differentiated by the characters given in the key.

Brachycistis (Brachycistis) arenivaga new species

♂. Brownish orange; legs and antennae yellow; head reddish black; clothed with sparse, erect, yellow pubescence; wings hyaline; Sc + R + M brown, the other veins translucent yellow, the stigma golden yellow. Length, 8 mm.

Head with few minute punctures; ocelli large, prominent, a faint impressed line behind them, obsolete medially, and a faint longitudinal impression between them; measurements: .25 mm., .21 mm., .38 mm.; front medially prominent above the antennae, but without tubercles, except two vague lateral ones; lower rim of each antennal socket simple; clypeus slightly elevated medially, its surface nearly glabrous, polished, the edge emarginate medially, not thickened; mandible with its middle tooth smaller than the inner and more or less fused with it, the carina prominent, extending half way to the base; gular orifice small, its sides scarcely margined, removed from the eyes by more than the length of the last segment of the labial palpus, and from the swelling at the condyle of the mandible by about one and one-half times the thickness of the same.

Humeral angles wanting; pronotum sparsely and minutely punctured, laterally almost impunctate; mesonotum polished, with few minute punctures, depressed in front of the scutellum, the lateral grooves well marked; scutellum convex, its disc almost impunctate and polished, its sides with numerous smaller punctures; postscutellum impunctate, its sides without the usual minute punctulation; mesopleura with the surface regular, polished, almost impunctate, the punctures being very few, small, and shallow; each mesopleurum bears a pit in front of its posterior margin; propodeum polished, impunctate above, with a faint median impressed line, the hind surface steeply declivous, beset with hairs, not separated from the dorsal surface, the posterior lateral angles rounded, not prominent, the sides polished, impunctate.

Wing venation as shown in figure 16.

Anterior metatarsus without a row of spines, although there are two inconspicuous spines on its inner surface; middle tibia with a few feeble spines on the apical part of its outer surface, largely concealed; posterior tibia without spines.

First abdominal segment short, dorsally entirely sessile with the second, enlarged directly from the base, without an anterior neck, its surface polished

like that of the rest of the abdomen, with only sparse, minute, setigerous punctures; pygidium tapered, slightly notched at apex, its sides margined so far ventrad as to appear immargined from a dorsal view; polished, with uniform surface and almost impunctate.

Sagitta blade-like but short, thick, and blunt; volsella reduced to a basal disc; ramus oblique, its posterior margin sinuate, the upper posterior angle not produced, rolled broadly inward; a brush of hairs on the inner side; squama without notched posterior margin; uncus as seen from the side strongly curved, long, somewhat widened toward the obtuse tip; as seen from above, it is strongly compressed, flaring at apex, the extreme apex slightly notched (figures 41 and 42).

Type material.—Holotype: Calexico, Imperial County, California, August 11, 1914, (the author), [Cornell University, No. 121.1]. Two paratopotypes, same date, [Cornell University, Nos. 121.2 and 121.3].

From *B. eriopis*, which is perhaps its closest ally, *arenivaga* may be known by its smaller size, and by having only two small spines on the anterior metatarsus, instead of five preapical spines in two rows. The short sagittae distinguish the species from all the others in its group whose genitalia have been examined.

Brachycistis (Brachycistis) ampla (Blake), ♂.

COLORADO: [*Types*, American Entomological Society]; Fox gives also, Custer, (T. D. A. Cockerell).

Brachycistis (Brachycistis) protracta new species

♂. Castaneous, the base of the abdomen a little lighter, the legs shading into yellow, the antennae yellowish brown; clothed with sparse, rather long, nearly white pubescence; wings hyaline; the veins of various shades of brown; Sc + R + M and the stigma dark brown. Length, 20 mm.

Head .43 wider (width 2.66 mm.) than the least distance between the tegulae (1.85 mm.); head polished, shining, with a very few minute punctures; ocelli large, prominent, a weak impressed line behind but none between them; their measurements: .43 mm., .25 mm., .6 mm.; forehead above the base of the antennae with four raised points, the inner two inconspicuous; the lower margin of each antennal socket thin, without a downward projecting tubercle; clypeus nearly flat, its margin forming a depressed crescent, at the middle of the base of which is a wholly inconspicuous tubercle; mandible with its inner tooth somewhat smaller than the intermediate, the carina straight and extending only half way to the base; gular orifice small, its lateral margin elevated into a thin, angularly prominent carina, distant from the eye by about the length of the last segment of the labial palpus, and from the swelling at the condyle of the mandible by nearly twice the thickness of the same. Antenna long and slender, crenulate toward its apex, the basal segment of the flagellum .15 mm. thick and 1.28 mm. long, seven and one-half times the length of the pedicel.

Humeral angles wanting; pronotum polished, shining, with very sparsely and irregularly scattered minute punctures; mesonotum similarly sculptured, deeply impressed just in front of the scutellum; lateral lines distinct; disc of the scutellum with a few punctures, polished, shining, its sides, as also those of the postscutellum, closely and minutely punctulate; disc of postscutellum without punctures; mesopleura obliquely elongate, not strongly swollen and without appreciable rugosity, a small pit at quite a distance cephalad of the upper part of the posterior border, the surface polished, shining, with very sparsely but rather regularly scattered minute punctures; propodeum low and very elongate, with no appreciable posterior face, its surface smooth, polished, impunctate and without sculpture except for the few minute punctures from which hairs arise caudally and laterally.

Stigma long, rather narrow, cell $2d\ R_1 + R_2$ extending beyond the apex of the stigma by about the width of the same; cell R_4 large, about as long as high; R_5 opposite the radial cross-vein; $r-m$ inserted on M slightly nearer to $M\ 3 + 4$ than to $m-cu$.

Anterior metatarsus with a few spines on its inner surface; middle tibia with very strong spines on the apical half of its outer surface, the stoutest being on the posterior edge; posterior tibia with five or six stout spines on its margin.

Abdomen long petiolate, the first segment as viewed from the side, evenly and but slightly enlarged posteriorly, four times as long (3.2 mm.) as its greatest dorso-ventral thickness (.8 mm.); viewed from above it is more appreciably thickened, with a median longitudinal depression just before the apex; abdomen polished, shining, with only sparse and very small setigerous punctures; pygidium flat, obtusely truncate, with ill-defined margins, and a few coarse punctures on its sides.

Sagitta long and slender, acute, reaching nearly to the tip of the uncus; volsella reduced to a small chitinated button; ramus short but very broad, its superior hind angle not at all produced, entirely rounded and turned inward, a brush of stout bristles on the inner surface; squama slender, acute, posterior margin not differentiated from the inferior, and not notched; uncus slender, as seen from above compressed, widened at the apex, but with a thin flaring inferior margin, stopping abruptly short of the base, the apex deeply notched.

Type.—Phoenix, Arizona. [American Entomological Society.]

This is the largest known species of *Brachycistis*.

It finds its nearest relative in *amplus* Cresson, the two being distinguished from all others by their long slender petioles and by their long, low, and rounded propodea.

Brachycistis (Brachycistis) gaudii Cockerell, ♂.

1901. *Brachycistis gaudii* Cockerell, Can. Ent., 33: 340, ♂.

1903. *Brachycistis gaudii* Melander, Trans. Amer. Ent. Soc., 29: 329, ♂.

Illustration of forewing, pl. IV, fig. 64.

I have not seen a specimen of this species. Professor Cockerell writes me that the type is in the United States National Museum.

CALIFORNIA: La Jolla, Aug. 1901, 3 ♂, at light, *types*.

Brachycistis (Brachycistis) elegantula Cockerell and Casad, ♂.

Genitalia: Sagitta long and slender, blade-like, subacute; volsella reduced to a small scale; ramus broad; squama long and slender, its apical margin entire; uncus long and slender, scarcely widened before and notched at the tip (figure 48).

Description and figure drawn from a specimen in the collection of the American Entomological Society, presumably from the type series.

NEW MEXICO: Mesilla Park, September 22, 1894, many male types, (T. D. A. Cockerell).

Brachycistis (Brachycistis) petiolata Fox, ♂.

LOWER CALIFORNIA: Calmalli Mines, April, [*Type*, American Entomological Society].

Brachycistis (Brachycistis) carinata Fox, ♂.

Genitalia: Sagitta long, slender, blade-like, ending very slightly before the tip of the uncus; volsella a minute scale; squama slender, with an entire apical margin; uncus, from a dorsal view long and slender, strongly widened just before the tip, which is broadly notched, from the side swollen before and tapered at the apex (figure 44).

Described from a homotype from La Jolla, California.

CALIFORNIA: [*Type*, American Entomological Society]; La Jolla, June 25, 1913, 1 ♂, (E. P. Van Duzee), [Cornell University]; San Diego County, June 28, 1913, 1 ♂, (E. P. Van Duzee), [Cornell University]; Claremont, 2 ♂, (C. F. Baker), [Pomona College and Cornell University]; Ramona, San Diego County, August 15, 1914, 1 ♂, (the author), [Cornell University].

Brachycistis (Brachycistis) idioles Cockerell, ♂.

1903. *Brachycistis idoles* Melander, Trans. Amer. Ent. Soc., 29: 327, ♂. Forewing illustrated, pl. IV, fig. 62.

NEW MEXICO: Las Cruces, *type* partly destroyed by *Anthrenus*, (T. D. A. Cockerell).

Brachycistis (Brachycistis) aequalis Fox, ♂.

COLORADO. NEVADA. ARIZONA. [*Type* series, American Entomological Society.]

Brachycistis (Brachycistis) noctivaga new species

♂. Brownish orange; legs and antennae yellow; clothed with a sparse, somewhat yellowish pubescence; wings hyaline; the veins and stigma yellow; Sc + R + M, except at apex, brown.

Head smooth, more or less polished, with only a few punctures; ocelli very large and prominent, with a transverse impression behind but no impression between them, their measurements: .38 mm., .23 mm., .45 mm.; an oblique carina on each side of the forehead, limiting an impressed basin above each antenna, the carinae originating close above the antennae, close to the eye, and converging upward; between these two basins the surface prominent and slightly rugose; inferior margin of each antennal socket not thickened, but with a slight tubercle below; margin of the clypeus prominent, medially with a broad process projecting downward, on either side of which the margin is deeply notched; mandible with the two inner teeth of equal size, unusually acute, the only remnant of a carina being a short tubercle at some distance from the inner tooth; gular orifice moderately broad, its margin produced into a tooth at the side, distant from the eyes by more than the length of the last segment of the labial palpus, from the swelling at the condyle of the mandibles by slightly more than the thickness of the same. Antennae somewhat crenulate toward their tips.

Humeral angles quite noticeable but not very prominent; sides of the pronotum coarsely and closely punctured, more sparsely below, the dorsal surface with only minute punctures except along the posterior margin; mesonotum coarsely but sparsely punctured, bearing strong lateral grooves; scutellum with a longitudinal impressed line and coarse punctures on the disc, its sides and the postscutellum closely and minutely punctulate; mesopleura with coarse but mostly sparse punctures, very irregularly and rugosely swollen, a large impressed basin on the most swollen part of each, bordered posteriorly by a curved carina and above by a marked rugosity; dorsal surface of the propodeum shagreened, with a broad parallel-sided, deep, median channel, traversed by four cross-bars; at its apex an equally broad and deep, sinuous, transverse channel, the posterior border of which is formed by a carina separating the dorsal from the almost vertical, flat, caudal surface; coarse punctures, becoming in places rugose, are borne on the upper part of the lateral and caudal faces.

Wing venation as shown in figure 11.

Inner surface of the anterior tibia with a transverse subapical row of three spines; inner surface of the anterior metatarsus with three prominent spines; outer surface of the middle tibia spinose, almost to the base, and with four coarse spines near the apex of the posterior edge; posterior tibia with five or six spines along the posterior edge.

First abdominal segment short, rather broad and thick, enlarging almost from the very base, with only a very short anterior neck; as seen from above noticeably constricted from the wide second segment; basal third of the second ventral segment with a strong raised longitudinal keel, ending in a sharp tooth posteriorly; first segment laterally, closely and coarsely punctured, dorsally with sparse punctures, remaining segments polished, with only sparse, minute, setigerous punctures; pygidium truncate, with weak lateral carinae, and coarse punctures toward the sides at base.

Sagitta blade-like, but short and blunt; produced externally along the middle; volsella a compressed disc; ramus nearly quadrangular, its posterior edge almost straight, its superior hind angle not at all produced; the inner surface with a brush of bristles; squama short and wide, its posterior margin entire; uncus as seen from the side straight and tapering bluntly to the apex, from above keeled in the middle, sloping steeply to the nearly parallel side, tip deeply but narrowly notched (figures 35, 36, and 37).

Type material.—Holotype: Las Vegas, Nevada, September 17, 1908, (the author), [Cornell University, No. 122.1]. Paratype: Nevada, [American Entomological Society].

This species is allied to both *aequalis* and *idiotes*, which have each an elongate marginal cell, and would possibly go along with *noctivaga* into Andre's genus *Milluta* if this genus were recognized, were it not for their simple tarsal claws. The sculpture of the mesopleura, forehead and propodeum abundantly distinguish *noctivaga* from any other.

Brachycistis (Brachycistis) thermarum new species

♂. Brownish orange; legs and antennae yellowish orange; clothed with sparse, slightly yellowish pubescence; the wings hyaline, with pale yellow veins and stigma. Length, 10 mm.

Head polished, shining, with punctures irregularly and sparsely scattered; ocelli large, moderately prominent, with a deep, impressed, transverse line behind them, but no longitudinal line between; measurements: .28 mm., 3 mm., .38 mm.; forehead above the base of the antennae with four tubercles; inferior margins of the antennal sockets somewhat incrassate, with a small tubercle projecting downwards; clypeus slightly raised to a median ante-marginal point or small tubercle, from there sloping to the shallowly emarginate edge; mandible with its inner two teeth equal in size, acute, a carina extending from the inner toward but disappearing before the base of the mandible; gular orifice small, its edge removed from the eye by more than the length of the last segment of the labial palpus, and from the swelling at the base of the condyle of the mandible by more than twice the apparent width of the same. Antennae strongly crenulate, especially toward their apices.

Pronotum with prominent humeral angles, its surface coarsely and closely punctate, the punctures a little sparser on the lower part of the sides; mesonotum bearing coarse, only moderately sparse punctures, and distinct lateral grooves; scutellum with coarse and sparse punctures, its sides with a few closer punctures and some minute punctulations; postscutellum closely minutely punctulate, with also two or three coarse punctures; mesopleura coarsely punctured, the punctures confluent close to the superior border, becoming sparse as they approach the sternum, the surface prominent but only slightly irregularly swollen; dorsal face of the propodeum impunctate, with a median longitudinal impressed channel, separated from the posterior face by a transverse carina; the lateral angles prominent, with a few coarse punctures,

extended along the top of the lateral faces, which bear also a few small punctures above but none below; posterior face sharply declivous, with a few hairs arising from small punctures.

Wing venation as shown in figure 10.

Inner surface of the anterior metatarsus with a few erect but not stout spines; middle tibia with a group of stout spines on the apical part of its outer surface, two or three near the apex on the posterior margin being especially stout; posterior tibia with a few stout spines on its posterior border and on the apical part of its outer surface.

Abdomen sessile, the basal segment short, broad and rather thick, enlarging directly from the base, without anterior neck, separated by a shallow depression from the second ventral; the latter with convex horizontal surface only and no transverse carina; sides of the first segment coarsely and closely punctate, its dorsal surface and the rest of the abdomen polished, very sparsely and finely punctate; pygidium shallowly emarginate, its sides sharply margined, bearing a median, longitudinal, slightly raised, impunctate fold, the depressed areas between this and the margins with a few punctures.

Sagitta much reduced, slightly chitinized, each forming a thin-edged, rolled plate, somewhat as in *crassa*; volsella a small compressed disc; ramus broad, its apical margin broadly emarginate, the postero-dorsal angle forming a prominent bluntly pointed process, the inner surface with a sparse brush of setae; squama broad, its posterior margin not notched; uncus as seen from the side strongly falcate from beyond a prominent angle near the base, as seen from above, flattened, its apex obtusely truncate, not at all emarginate (figures 31, 32, and 33).

Type.—Hot Springs, Arizona, July 2, 1902, (E. J. Osler), [Cornell University, No. 123.1].

This species finds its nearest relatives in *crassa*, *castanea* and *stygia*. The shape of the uncus is absolutely distinctive, as far as I have observed.

Brachycistis (Brachycistis) castanea (Cresson), ♂.

1865. *Mutilla castanea* Cresson, Proc. Ent. Soc. Phila., 4: 388, ♂.

Genitalia: Sagitta very short and blunt, each bearing externally toward its apex a pitted chitinous bulb, and overlapped by the ends of the short volsella, which is still smaller than the sagitta; ramus large, thick, its posterior margin deeply concave, its inner surface with an inconspicuous setiferous area; squama short and thick, its posterior margin deeply notched, its upper angle produced into an acute lobe; uncus straight, thick and blunt, greatly widened before and abruptly tapered to the apex (figures 27 and 30).

The description and figures of the genitalia are drawn from a balsam mount made from a homotype from Durango, Colorado.

Some of the specimens found standing in the collection of the American Entomological Society under this name, and so recorded by Fox, belong to other species.

LOWER CALIFORNIA: Cape St. Lucas, [*Type*, American Entomological Society, no. 1894]. NEW MEXICO: Albuquerque, no date, 2 ♂, July 16, 1902, 1 ♂, (E. J. Oslar), [Cornell University]. COLORADO: Durango, 1 ♂, (E. J. Oslar), [Cornell University].

Brachycistis (Brachycistis) stygia new species

♂. Entirely coal black, with white pubescence; wings hyaline, infuscated beyond the stigma, especially along the costal margin, becoming clearer again toward the margin. Length, 13.5 mm.

Head polished, shining, with sparse but not small punctures; ocelli smaller than usual, not very prominent, the posterior pair removed by twice their diameter from the eyes; measurements: .25 mm., .5 mm., .6 mm.; a faint, transverse impression behind the posterior pair, but no longitudinal impressed line between them; forehead above the antennae simple; inferior margin of each antennal socket thin, without a tubercle, closely short-hirsute; clypeus not tuberculate, thickly punctured toward the margin, which is thickened, emarginate, and slightly raised; mandible with the inner two teeth strong and blunt, of equal size, a falcate blunt carina extending from the inner one to the base; gular orifice small, its margin removed from the eye by considerably more than the length of the ultimate segment of the labial palpus, and from the globular swelling at the condyle of the mandible by considerably more than the apparent diameter of the same. Antennae strongly crenulate toward their apices.

Pronotum with prominent but rounded humeral angles, these and its dorsal surface closely coarsely punctured, its sides sparsely punctured; mesonotum, disc of scutellum, and postscutellum with sparse, but coarse punctures; lateral grooves distinct; sides of the scutellum and postscutellum closely punctured; mesopleura closely punctured, the punctures becoming sparse on the sternum, which is separated from the pleura by fine impressed lines, obsolete both anteriorly and posteriorly; surface of each mesopleurum swollen and uneven, with a small but deep pit on the posterior summit of the swollen part; superior surface of the propodeum mostly impunctate, with a broad median depressed channel, the posterior part of which, as well as the posterior surface on either side, is sculptured with large, shallow, irregular depressions; dorsal face of the propodeum separated from the posterior by a transverse carina; the lateral angles prominent, sharp, strongly and closely punctured, the punctures becoming obsolete on the depressed lower part of the sides; the posterior face of the propodeum almost vertical, somewhat hirsute.

Wing venation as shown in figure 7; the veins and stigma piceous.

Legs armed as described for *crassa*.

Abdomen sessile, the basal segment short, broad, and thick, enlarging directly from the base without any anterior neck, separated by a moderate constriction from the second ventral; the latter with a convex horizontal surface only, without a transverse carina; first segment coarsely and closely, but dorsally sparsely and finely punctate; remaining segments finely and sparsely punctured; pygidium truncate, its sides strongly margined, and with a median,

longitudinal, strongly raised fold, a few moderate punctures in the depressed area between this fold and the margin.

Sagitta much reduced, strongly chitimized, its tip transversely truncate, thickened and tricuspid; volsella a very small, compressed, strongly chitimized, oval plate; ramus large, broad, its apex deeply emarginate, its upper posterior angle acute, its inner surface without a hirsute patch, but with an oblique row of ciliae; squama, by reason of a deep posterior notch, bifurcate, the upper prong slender, acute; uncus rather short, much thickened before and acute at the apex, not at all notched (figures 24, 25 and 26).

In one paratype the vein r-m is almost opposite m-cu.

Type material.—Holotype: Nogales, Arizona, June 21, 1903, (E. J. Osler), [Cornell University No. 124.1]. Four paratypes: Arizona, [American Entomological Society and Cornell University, No. 124.2].

This species finds its closest relatives in *castanea*, *crassa* and *thermarum*. The peculiar tricuspid sagittae I have not observed in any other species. Its general appearance distinguishes it at a glance from any other species of the genus.

Brachycistis (Brachycistis) crassa new species

♂. Brownish orange; femora orange; tibiae and tarsi yellow; wings stained slightly yellowish, the veins and stigma light brown; clothed with sparse yellowish pubescence. Length, 13 mm.

Head polished, shining, with punctures small and scattered; ocelli large, prominent, their measurements: .3 mm., .4 mm., .6 mm.; a weak longitudinal impression between the posterior ocelli, but no transverse line behind them; middle of the forehead above the base of the antennae elevated, without tubercles or carinae; inferior margin of each antennal socket thickened and produced into a strong triangular tubercle projecting downward; clypeus not tuberculate, elevated toward the apex, with thick and slightly emarginate margin; mandible with the inner two teeth strong, of equal size, a comparatively weak carina extending from the inner one about half way to the base; gular orifice small, its lateral margin removed from the eye by more than the length of the last segment of the labial palpus, and from the globular swelling at the condyle of the mandible by about twice the apparent width of the same. Antennae noticeably crenulate toward their apices.

Pronotum with unusually prominent, but not sharp, humeral angles, closely and coarsely punctured, the rest of its surface sparsely punctured; mesonotum polished, shining, with few punctures, and deeply impressed lateral grooves; scutellum with its disc sparsely punctate, laterally and posteriorly closely punctate as is also the postscutellum; mesopleura closely punctured, the punctures becoming sparse on the sternum, the surface irregular by reason of a superior wen, ending posteriorly in a chitinous tubercle; superior face of the propodeum impunctate, glabrous, and polished, with a longitudinal median bottle-shaped furrow, the dorsal face separated from the posterior by a sharp

transverse carina; the lateral angles prominent, sharp, and strongly punctured, the punctures becoming obsolete on the lower part of the sides; the posterior face strongly declivous and hirsute.

Wing venation as shown in figure 6; the veins and stigma brown, Sc+R+M very dark brown, the margin beyond the stigma slightly and indefinitely infuscated.

Anterior metatarsus with a few inconspicuous slender spines among the hairs which cover it; middle tibia with a group of ten or twelve prominent coarse spines on the apical half of its outer surface, two or three near the apex of the posterior edge being coarse and peg-like; posterior tibia with about six stout spines along its posterior margin and a few small ones scattered over the apical part of the outer surface and largely concealed by the hairs thereon.

Abdomen sessile; the basal segment short, broad and thick, enlarging directly from the base without any anterior neck, separated by a deep constriction from the second ventral; this segment with a convex horizontal surface, and a nearly vertical, plane, basal surface, the two separated by an undulating transverse chitinous ridge, entirely characteristic of the species; first segment coarsely and closely punctured, the others very polished and sparsely punctured; pygidium obtuse, its lateral margins indefinite, with a very slightly raised median area and numerous coarse lateral punctures.

Sagitta much reduced, each forming a thin edged, longitudinally rolled plate without apical processes or thickening; volsella reduced to a chitinous concealed tubercle; ramus large, without a hirsute patch on its inner side; squama thick, blunt, its apical margin notched but not deeply so; uncus of a form peculiar to this species, being deflexed and with the apical portion bent backward at an acute angle, its tip bifid and spread out, resembling the digits of a tree-toad (figures 21, 22, and 23).

Type material.—Holotype from Coalinga, Fresno County, California, June 1 to 3, 1907, below 500 ft. elevation (the author), [Cornell University, No. 125.1]. One paratopotype: same date, [Cornell University, No. 125.2]. One paratype from Calexico in the Imperial Valley, California, August 11, 1914, (the author), [Cornell University, No. 125.3]. Three paratypes from Nogales, Arizona, June 21 and 22, and July 10, 1903, (E. J. Oslar), [Cornell University, Nos. 125.4 to 125.6]. One paratype from Durango, Colorado, July 17, 1900, (E. J. Oslar), [Cornell University No. 125.7].

This species finds its closest relatives in *stygia*, *castanea* and *thermarum*. The transverse ridge on the second ventral segment, and the peculiar shape of the uncus with its upturned apex, abundantly distinguish it from any other known species.

Brachycistis (Brachycistis) brevis Fox, ♂.

Genitalia: Sagitta reduced to a short truncate lamella; volsella a small chitinous lobe; ramus short and broad, its upper hind angle acute, its inner side with a patch of setae; squama acute, with an entire margin; uncus rather long and slender, gradually widened to and truncate at the apex, somewhat deflexed (figures 34 and 38).

The description and figures of the genitalia are drawn from a specimen in the collection of Cornell University, that has been found, on comparison, to agree with the type.

CALIFORNIA: [*Type*, American Entomological Society]; Calexico, August 11, 1914, 6♂, [Cornell University].

Brachycistis (Brachycistis) eremi new species

♂. Brownish orange; the mouth parts, antennae and legs yellow; a spot between the ocelli black; sparsely clothed with yellowish pubescence; wings hyaline, the veins pale, washed with brownish yellow, the stigma and Sc + R + M brown. Length, 9 mm.; slender.

Head polished, with a few small punctures; ocelli large, prominent, without an impressed line behind or between them, their measurements: .25 mm., .23 mm., .3 mm.; forehead with a transverse row of four tooth-like tubercles above the antennae; inferior margin of each antennal socket thickened and with a tubercle projecting downward; clypeus raised toward a premarginal median point, which as seen from the side appears as a prominent tubercle, from this abruptly declivous to the scarcely concave edge; teeth of the mandible in the type much worn, in paratypes the inner two are of equal size, acute, a carina extending from the inner one about half-way toward the base of the mandible; gular orifice small, its margin distant from the eye by considerably more than the length of the last segment of the labial palpus, and from the globular swelling at the condyle of the mandible by more than its width. Antennae crenulate toward their apices.

Pronotum with humeral angles not prominent, its entire surface rather sparsely punctured; mesonotum polished and shining, bearing a few scattered punctures and deeply impressed lateral grooves; scutellum with a few scattered punctures on its disc, its sides closely finely punctured; postscutellum with disc impunctate, the sides closely, finely punctured; mesopleura evenly but coarsely punctured, more sparsely toward the sternum, the surface prominently but not irregularly swollen, with a low tubercle near the upper part of the posterior margin of each; dorsal surface of the propodeum not punctured, except its sides, with a median area separated on either side by a carina, dorsal and posterior surfaces not separated by a transverse carina, the lateral angles rounded, not prominent, and no distinct line of separation between the dorsal, posterior and lateral faces; lateral angles coarsely but not rugosely punctured, the punctures extending forward along the upper part of the lateral surface and sides of the dorsal surface; the posterior face strongly declivous, with a few erect hairs and inconspicuous "spatter-punctures."

Wing venation as shown in figure 9.

Anterior metatarsus without noticeable spines; middle tibia with one or two inconspicuous spines near its apex on the outer surface, and two or three strong ones on the apical part of its posterior edge; posterior tibia with two or three spines on its posterior edge.

Abdomen sessile, its first segment short, broad, and thick, enlarged from almost the very base, without or with scarcely any anterior neck, rather deeply constricted from the second, its sides coarsely punctured; dorsally, like the rest of the abdomen it has few and small punctures; pygidium deeply emarginate, its sides margined, but not strongly, with a median, longitudinal, elevated, impunctate fold, between which and the sides are four or five coarse punctures.

Sagitta much reduced, weakly chitinized, as seen from the side squarely truncate, as seen from above, strongly compressed, the ends rolled outward; volsella a small compressed button; ramus moderately broad, its posterior margin emarginate, its superior hind angles not produced, bluntly rounded, its inner surface with a brush of a few weak hairs; squama acute, its posterior margin not notched; uncus deflexed, the basal half strongly compressed, the apical half flaring, truncate (figures 28 and 29).

Type material.—Holotype: Calxico in the Imperial Valley, California, August 11, 1914, (the author), [Cornell University, No. 126.1]. Thirteen paratopotypes: same date. The figures and description of the genitalia are from a paratype.

The position of the insertion of r-m on M in the front wings varies from slightly basad to slightly apicad of m-cu.

This species finds a very close ally in *B. brevis* Fox. In that species in addition to the characters used in the key, the uncus appears more trumpet shaped as seen from above, and the squamae are less slenderly acute.

Brachycistis (Brachycistis) perpunctata Cockerell, ♂.

The wings are illustrated in figure 20.

NEW MEXICO: Las Cruces, *type*. CALIFORNIA: Claremont, 1 ♂, and mountains near Claremont, 1 ♂, (C. F. Baker), [Cornell University and Pomona College].

Brachycistis rutilans (Blake), ♀.

A specimen before me agrees entirely with the type, but is in much better condition.

In describing this species Mr. Blake remarks that it differs from all others in the entire absence of pubescence. As a matter of fact the pubescence has simply been rubbed off of the type specimen. An examination shows not only the same close arrangement of minute punctures originally bearing the decumbent pubescence, and sparser larger punctures for the erect hairs, that

occurs in my specimen, but also bits of the pubescence still remaining in protected parts of the insect's anatomy.

In view of this fact, Mr. Blake's description is misleading and the following partial description will correct it.

Head everywhere very minutely and closely punctulate, the punctures having very short, white, decumbent pubescence, and except on the front, also with scattered, erect, white hairs born in larger punctures. Thorax, except the pleura and posterior face of the propodeum with a similar arrangement of pubescence; the pleura practically bare, slightly and irregularly aciculate; the propodeum with scattered, erect white hairs, but without the decumbent sericeous pubescence. The pubescence of the abdomen is somewhat complicated; dorsally, the cephalic slope of the basal segment has erect white hairs, the apex of each segment with a band of short erect black or dark hairs, interrupted medially on the second and fifth segments; two lateral yellow spots near the base of the second segment, a median one at the apex of the same, and a large median spot on the fifth segment are covered with short white hairs; each segment, especially apically, except the last, also bears long and scattered, dark, reddish hairs, some paler; ventrally the second segment bears sparse, short, white pubescence and longer scattered hairs, the third, fourth and fifth segments with erect pale hairs at apex, and the sixth with scattered darker hairs.

CALIFORNIA: [*Type*, American Entomological Society]; Felton in the Santa Cruz Mountains, May 20 to 25, 1907, between 300 and 500 feet elevation, 1 ♀, (the author), [Cornell University].

***Brachycistis bimaculata* Fox, ♀.**

MISSOURI: Ripley County, (P. J. Schmitt), [*Type*, American Entomological Society]. VIRGINIA: Falls Church, August 15, September 18, 2 ♀, (N. Banks), [N. Banks and Cornell University].

Unidentified species

***Brachycistis (Brachycistis) cremastogaster* Melander, ♂.**

1903. *Brachycistis cremastogaster* Melander, Trans. Amer. Ent. Soc., 29: 329, ♂.

TEXAS: [Chicago Academy of Sciences].

***Brachycistis (Brachycistis) stictinota* Viereck, ♂.**

1906. *Brachycistis stictinotus* Viereck, Trans. Amer. Ent. Soc., 32: 190, ♂.

I know of no other record of a species of this genus from as far east as Kansas.

KANSAS: Clark County, 1962 feet elevation, June, 1 ♂, [*Type*, University of Kansas].

First abdominal segment short and stout, the second very deep; last dorsal segment without a distinct pygidial area, its apex reflexed and slightly emarginate; surface of the abdomen shining, but with rather long setae more numerous than on the thorax.

CALIFORNIA: Calexico, August 11, 1915, 1 ♂, (J. C. Bradley), [Cornell University].

Type: Cornell University no. 129.1

Brachycistis (Brachycistellus) marcida new species

♂. Piceous, *i.e.* a little darker than Vandyke brown, the antennae, tegulae and the legs except the coxae testaceous, almost honey yellow. Wings hyaline, the veins weak, the stigma piceous. Length, 4.7 mm.

Surface of the head and thorax polished, with scattered large punctures bearing long hairs; front prominent between the ocelli; the hind ocelli .17 mm. in diameter, .17 mm. from the eyes, .28 mm. from each other, .11 mm. from the front ocellus, the diameter of which is .14 mm.; front, antennal sockets and clypeus as in the preceding species; mandibles with two equal teeth placed side by side before the apex, the surface without carinae.

The thorax, legs, and wings as in the preceding species, except that the marginal cell extends by about the width of the vein R_4 beyond the end of the stigma.

The abdomen, except for the first and last segments is like the preceding; there is a weakly marked pygidial area, smooth medially, laterally with punctures and a weak bordering ridge, posteriorly the edge is not reflexed.

CALIFORNIA: Calexico, August 11, 1914, 1 ♂, (J. C. Bradley), [Cornell University].

Type: Cornell University no. 130.1

CHYPHOTES Blake

Type: *Chyphotes elevatus* Blake, (genus monobasic).

In the following table to males, two described species are omitted, *piceiceps* Baker and *californicus* Baker. They each fall in category 5, but Mr. Baker has not mentioned the characters by which I further subdivide that section of the genus, and as I have not seen either species, I am unable to include them,

Males

1. Front wings with veins R_4 and R_5 both present, therefore with three submarginal cells. (2)
Front wings with vein R_5 lacking, therefore with two submarginal cells. (5)
2. Fourth and fifth ventral segments armed with a comb of several stiff bristles on each side near the apex. (3)
Fourth and fifth ventral segments without such a comb. (4)
3. Second segment of the petiole strongly gibbous, its sides very markedly convex; R_4 and R_5 nearly straight, parallel, the cell R_4 quadrate.

nubeculus (Cresson)

- Second segment of the petiole swollen but not strongly gibbous, its sides but slightly convex; R_4 and R_5 sinuate, slightly divergent above, the cell R_4 nearly rhomboidal.....**heathii** Melander
4. Length, 7 to 8 mm.; head piceous; second segment of flagellum longer than the first.....**similis** Baker
Length, 11 to 12 mm.; head concolorous; second segment of the flagellum of a length equal to that of the first.....**albipes** (Cresson)
5. Metasternum with a strongly elevated prominence in front of each coxa; mesosternum with a small tooth cephalo-mesad of each coxa.....(6)
Metasternum with a small tubercle in front of each coxa; mesosternum with a transverse ridge in front of the coxae (Lower California).
peninsularis Fox
6. Apical part of petiole ovate.....(7)
Apical part of petiole globose; posterior ocelli nearer the compound eyes than to each other.....**calexicensis** new species
7. Pubescence on apical portion of abdomen yellow; abdomen castaneous throughout.....**melaniceps** (Blake)
Pubescence on apical portion of abdomen white; third dorsal segment black or with a transverse black band.....**belfragei** (Blake)

Females

As I have not studied the females of this genus I refer the reader to the table by Fox.⁶ As *peculiaris* (Cresson) is now removed to another genus, the table may be commenced at category 2.

Chyphotes peninsularis Fox, ♂.

LOWER CALIFORNIA: [*Type*, American Entomological Society].

Chyphotes calexicensis new species

♂. Two submarginal cells, the second as long as the first; metasternum with two strong, flattened processes; petiole very strongly gibbous behind; pubescence yellowish at tip of the abdomen.

Testaceous, head except face black; abdomen reddish-testaceous; flagellum yellow; scape and legs pale straw-colored; face and base of mandibles testaceous, their tips black; entire insect covered with very noticeable, long, silky, white pubescence, stained yellow toward the apex of the abdomen. Length, 12.5 mm.; of fore-wing, 8.4 mm.

⁶Transactions of the American Entomological Society, 1899, 25: 275.

As seen from above the head is but slightly narrowed behind the eyes, rather distinctly truncate caudad, the occiput margined; from in front the eyes appear very prominent and bead-like, reaching the base of the mandibles, and converging below; from a lateral view the cephalic surface of the head is nearly plane, the temples about as wide as the posterior ocellus; the eyes appear black polished, the facets not visible under a low power; the vertex, occiput, temples, and gular regions are black, moderately coarsely but sparsely punctate, the punctures bearing both erect, white and short, sparse, decumbent hairs; the ocelli are large and prominent, the posterior pair slightly larger than the anterior one, placed slightly nearer to the compound eyes than to each other, the vertex between the three forming a raised triangular area; there is a groove extending from the anterior ocellus to between the antennae, which are approximate, almost attingent, their bases sheathed each by a scale-like projection of the frons; elevation of the latter higher than that of the face; clypeus and face not separated, together convex, coarsely punctured, the apex rather deeply emarginate, beneath which the labrum is apparent, fringed with long white hairs; face, including the projections of the frons at the base of the antennae, the labrum, and the bases of the mandibles, testaceous; a portion of the face laterad of the convex central part is plane smooth and impunctate; just below the antennae it is noticeably depressed; mandibles rather long, slender, evenly curved, with a single blunt tooth within, dark toward their apices; mouthparts testaceous, the second segment of the apparently four-segmented labial palpi wide and flattened. Antenna filiform, yellow, the scape paler than the rest, bearing white hairs, the flagellum naked except for a very fine, close and short puberulence; scape and pedicel together a little shorter than the following segment, the pedicel on its outer (longest) side about one-third the length of the following segment, much less within; no distinct area differentiated from the rest at the base of the first flagellar segment, such as is noticeable in some species.

Pronotum dorsally and laterally coarsely but not closely punctured, with erect and a small quantity of inconspicuous decumbent pubescence; propleura mostly smooth, with only a few scattered hairs, except for a conspicuous brush of straight, closely set, white hairs in front of each coxa; mesonotum and scutellum sculptured very much like the head and pronotum, the lateral lines almost obliterated; scutellum with its white hairs longer than on the mesonotum, moderately truncate, its sides weakly margined anteriorly; post-scutellum convex and prominent; pleura more closely and roughly punctured than the dorsum, the vestiture similar; mesosternum produced on each side in front of the middle coxae into a sharp tooth pointing caudo-ventrad, the two connected by a weak ridge, from which a weak median carina projects caudad on the metaventer, on the latter, in front of each posterior coxa, a long flattened mammiliform process, projecting due ventrad; propodeum strongly and coarsely reticulate, the reticulations smaller on the sides.

Wings milky, with a fuscous spot along the costal margin beyond the venation; the veins and stigma weak and flavous; C and Sc + R + M each with a double row of stout, rather long hairs, the two rows more or less merged on C

and continued onto the stigma; other veins with a few groups or short rows of similar hairs; venation as shown in figure 4.

Legs honey-yellow, with conspicuous erect white hairs, the tibiae bearing in addition short pubescence, and the tarsi dense appressed pubescence, amongst which red spines are partially concealed; posterior metatarsus nearly as long as the remaining segments united, longer than the following three.

Anterior portion of the petiole enlarged, somewhat gibbous posteriorly, the posterior part greatly swollen, subglobose,



Fig. 1. Petiole of *Chyphotes calexcensis* new species.

strongly convex below, but less strongly than above (see the text figure), its ventral surface without median keel or prominence; the petiole and the following segment above and below coarsely punctured and clothed with sparse, erect, white hairs; the second ventral segment with a median longitudinal fossa; remaining segments finely and less roughly punctured, their vestiture more dense, on

the venter gathered most thickly along the apical margins, yellow toward the apex of the abdomen.

This species is most closely allied to *belfragei* and to *nigriceps*, from which it may be differentiated by the character employed in the table.

From *piceiceps* Baker and *californicus* Baker, which fall in this section of the genus, and both of which are omitted from the foregoing key to species, *calexcensis* may be distinguished by having its posterior ocelli placed distinctly nearer to the compound eyes than to each other, while in the two former the reverse is the case.

Type.—CALIFORNIA: Imperial County, August 11, 1914, 1 ♂, (the author), [Cornell University, No. 127.1].

Chyphotes nubeculus (Cresson), ♂.

COLORADO: [*Type*, American Entomological Society, no. 1889]; Denver, (recorded by Melander). NEW MEXICO: Las Cruces, San Marcial and Santa Fe (collected by T. D. A. Cockerell and recorded by Melander).

Chyphotes heathii Melander, ♂.

1903. *Chyphotes heathii* Melander, Trans. Amer. Ent. Soc., 29: 326, ♂. Pl. IV, fig. 61, forewing.

CALIFORNIA: Pacific Grove, May, 1901. 1 ♂, (Dr. Harold Heath), [*Type*, A. L. Melander]; Claremont (C. F. Baker), [Cornell University].

Chyphotes similis, Baker, ♂.

1903. *Chyphotes similis* Baker, Invertebrata pacifica, 1: 116, ♂.

CALIFORNIA: Claremont.

Chyphotes albipes (Cresson), ♂.

1903. *Chyphotes nevadensis* Baker, Invertebrata pacifica, 1: 116, ♂.

A careful comparison of the type with the description of *C.*

nevadensis Baker shows no significant points of difference, as Baker seems to have suspected might be the case. The distinction which he points out that, as stated by Fox, *albipes* has "the first and second transverse cubital veins uniting above" is not true of the type specimen of *albipes*. The two approach more or less closely but do not unite, and on one side are quite appreciably separated along the vein $r-R_3$.

In the type the first and second segments of the flagellum measure each .057mm., in one paratype each .061mm., while in the other paratype the antennae are broken. The characters used by Baker in his key in regard to the sculpture of the propodeum, would separate the type of *albipes* from *similis*, but seem subject to some variation, the condition in the paratypes somewhat approaching the condition described for *similis*.

COLORADO. NEVADA: [*Type*, American Entomological Society, no. 1888]; Kings Cañon, Ormsby County, *type* of *nevadensis*.

Chyphotes melaniceps (Blake), ♂.

Two specimens before me from California differ from the type in possessing a head which is concolorous with the rest of the body, instead of being black.

ARIZONA: (The type locality as given by Blake, but the type specimen bears no locality label). CALIFORNIA: Coalinga, Fresno County, June 1 to 3, 1907, 2 ♂, (the author), [Cornell University].

Chyphotes belfragel (Blake), ♂.

TEXAS: Fedor and Austin, (recorded by Melander). NEW MEXICO: Mesilla Park, (recorded by Melander); Albuquerque, July 18, 1902, (Oslar), [Cornell University]; Sandia Mountains, August 14 to 21, elevation 6500 to 7500 ft., 1 ♂, in "Open stand of juniper, piñon and cedar, with an abundance of annuals and perennials. Rainfall 10 to 15 inches per annum," (A. J. Jaenicke), [Cornell University]. ARIZONA: Huachuca Mountains, August 15, 1903, 1 ♂, (Oslar), [Cornell University]; Nogales, July 30, 1903, 1 ♂, (Oslar), [Cornell University]. COLORADO: Durango, 1 ♂, [Cornell University].

Chyphotes piceiceps Baker, ♂.

1903. *Chyphotes piceiceps* Baker, *Invertebrata pacifica*, 1:116, ♂.

This species and the following I have not seen.

CALIFORNIA: Claremont, *type*.

Chyphotes californicus Baker, ♂.

1903. *Chyphotes californicus* Baker, *Invertebrata pacifica*, 1:116, ♂.

CALIFORNIA: Claremont.

Chyphotes elevatus (Blake), ♀.

Chyphotes punctatus Fox, ♀.

Chyphotes testaceipes Fox, ♀.

Chyphotes petiolatus Fox, ♀.

TYPHOCTES Ashmead

1899. *Typhoctes* Ashmead, Journ. N. Y. Ent. Soc., 7:53.

Type: *Mutilla peculiaris* Cresson (by original designation).

Typhoctes peculiaris (Cresson), ♀.

1899. *Typhoctes peculiaris* Ashmead, Journ. N. Y. Ent. Soc., 7: 53.

CALIFORNIA [*Type*, American Entomological Society, no. 1890]. NEW MEXICO: Mesilla Park, (T. D. A. Cockerell, recorded by Melander).

Typhoctes attenuatus (Blake), ♂.

1903. *Chyphotes attenuatus* Melander, Trans. Amer. Ent. Soc., 29: 330, pl. IV, fig. 63 forewing.

1903. *Typhoctes attenuatus* André, Genera insectorum, fasc. 11, p. 11.

TEXAS: (Belfrage), [*Type*, American Entomological Society]. NEW MEXICO: Mesilla Park and Santa Fé (recorded by Melander). ARIZONA: Huachuca Mountains, August 17, 1903, 1 ♂ (Oslar), [Cornell University]; Phoenix, March 20, 1902, 1 ♂, (Oslar), [Cornell University].

EXPLANATION OF PLATES

Lettering on plates XXIII to XXV

- A. *Uncus*; crochet, Radoszkowski.
 B. *Squama*; branche du forceps, Radoszkowski.
 C. *Sagitta*; tenaculum, Radoszkowski.
 D. *Volsella*; volsella, Radoszkowski.
 E. *Ramus*; la base du forceps, Radoszkowski.

Plate XX

Wings

Drawn by the author from balsam mounts, projected by the Edinger apparatus.

- Fig. 1.—*Myrmosa* (*Myrmosula*) *parva* Fox.
 Fig. 2.—*Myrmosa* (*Myrmosa*) *unicolor* Say.
 Fig. 3.—*Typhoctes attenuata* (Blake).
 Fig. 4.—*Chyphotes calexcicensis* Bradley; holotype.
 Fig. 5.—*Brachycistis* (*Brachycistis*) *carinata* Fox; homotype.

Veins lettered according to the Comstock-Needham system of venation.

Plate XXI

Wings

Drawn by the author from balsam mounts, projected by the Edinger apparatus.

- Fig. 6.—*Brachycistis* (*Brachycistis*) *crassa* Bradley; paratype.
 Fig. 7.—*Brachycistis* (*Brachycistis*) *stygia* Bradley; paratype.
 Fig. 8.—*Brachycistis* (*Brachycistis*) *castanea* Fox; homotype.
 Fig. 9.—*Brachycistis* (*Brachycistis*) *eremi* Bradley; paratype.
 Fig. 10.—*Brachycistis* (*Brachycistis*) *thermarum* Bradley; holotype.
 Fig. 11.—*Brachycistis* (*Brachycistis*) *noctivaga* Bradley; holotype.
 Fig. 12.—*Brachycistis* (*Brachycistis*) *contigua* Fox; homotype.
 Fig. 13.—*Brachycistis* (*Brachycistis*) *ioachinensis* Bradley; paratype.

Plate XXII

Wings

Drawn by the author from balsam mounts, projected by the Edinger apparatus.

- Fig. 14.—*Brachycistis* (*Brachycistis*) *eriopis* Bradley; holotype.
 Fig. 15.—*Brachycistis* (*Brachycistis*) *micrommata* Bradley; holotype.
 Fig. 16.—*Brachycistis* (*Brachycistis*) *arenivaga* Bradley; paratype.
 Fig. 17.—*Brachycistis* (*Brachycistis*) *nuda* Fox.
 Fig. 18.—*Brachycistis* (*Brachycistis*) *dentata* Bradley; paratype.
 Fig. 19.—*Brachycistis* (*Brachycistis*) *nocticola* Bradley; paratype.
 Fig. 20.—*Brachycistis* (*Brachycistis*) *perpunctata* Cockerell.
 Fig. 50.—*Brachycistis* (*Brachycistellus*) *paupercula* Bradley; holotype.

Plate XXIII

Male genitalia

Figs. 21 to 26, 28 and 29 drawn by Miss Margaret Moles, from dry mounts, x 30.

Figs. 27 and 30 drawn by the author from a balsam mount, x 30.

Fig. 21.—*Brachycistis crassa* Bradley; holotype; dextral aspect.

Fig. 22.—*Brachycistis crassa* Bradley; holotype; dorsal aspect, right half.

Fig. 23.—*Brachycistis crassa* Bradley; holotype; dextral aspect of left half.

Fig. 24.—*Brachycistis stygia* Bradley; holotype; dextral aspect.

Fig. 25.—*Brachycistis stygia* Bradley; holotype; dorsal aspect of right half.

Fig. 26.—*Brachycistis stygia* Bradley; holotype; dextral aspect of left half.

Fig. 27.—*Brachycistis castanea* Fox; homotype; dextral aspect, from slide mounted in balsam.

Fig. 28.—*Brachycistis eremi* Bradley; paratype; dextral aspect.

Fig. 29.—*Brachycistis eremi* Bradley; paratype; dorsal aspect, right half.

Fig. 30.—*Brachycistis castanea* Fox; paratype; dextral aspect of left half.

Plate XXIV

Male genitalia

Drawn by Miss Margaret L. Moles, from dry mounts, x 38.

Fig. 31.—*Brachycistis thermarum* Bradley; holotype; dextral aspect.

Fig. 32.—*Brachycistis thermarum* Bradley; holotype; dorsal aspect of right half.

Fig. 33.—*Brachycistis thermarum* Bradley; holotype; dextral aspect of left half.

Fig. 34.—*Brachycistis brevis* Fox; dextral aspect.

Fig. 35.—*Brachycistis noctivaga* Bradley; holotype; dextral aspect.

Fig. 36.—*Brachycistis noctivaga* Bradley; holotype; dorsal aspect of right half.

Fig. 37.—*Brachycistis noctivaga* Bradley; holotype; dextral aspect of left half.

Fig. 38.—*Brachycistis brevis* Fox; dorsal aspect of left half.

Fig. 39.—*Brachycistis nocticola* Bradley; holotype; dextral aspect.

Fig. 40.—*Brachycistis nocticola* Bradley; holotype; dorsal aspect of right half.

Fig. 41.—*Brachycistis arenivaga* Bradley; holotype; dorsal aspect of right half.

Fig. 42.—*Brachycistis arenivaga* Bradley; holotype; dextral aspect.

Plate XXV

Male genitalia

Drawn by the author, from dry mounts, x 66.

Fig. 43.—*Brachycistis nevadensis* Fox; holotype; dextral aspect of left half.

Fig. 44.—*Brachycistis carinata* Fox; homotype; dextral aspect.

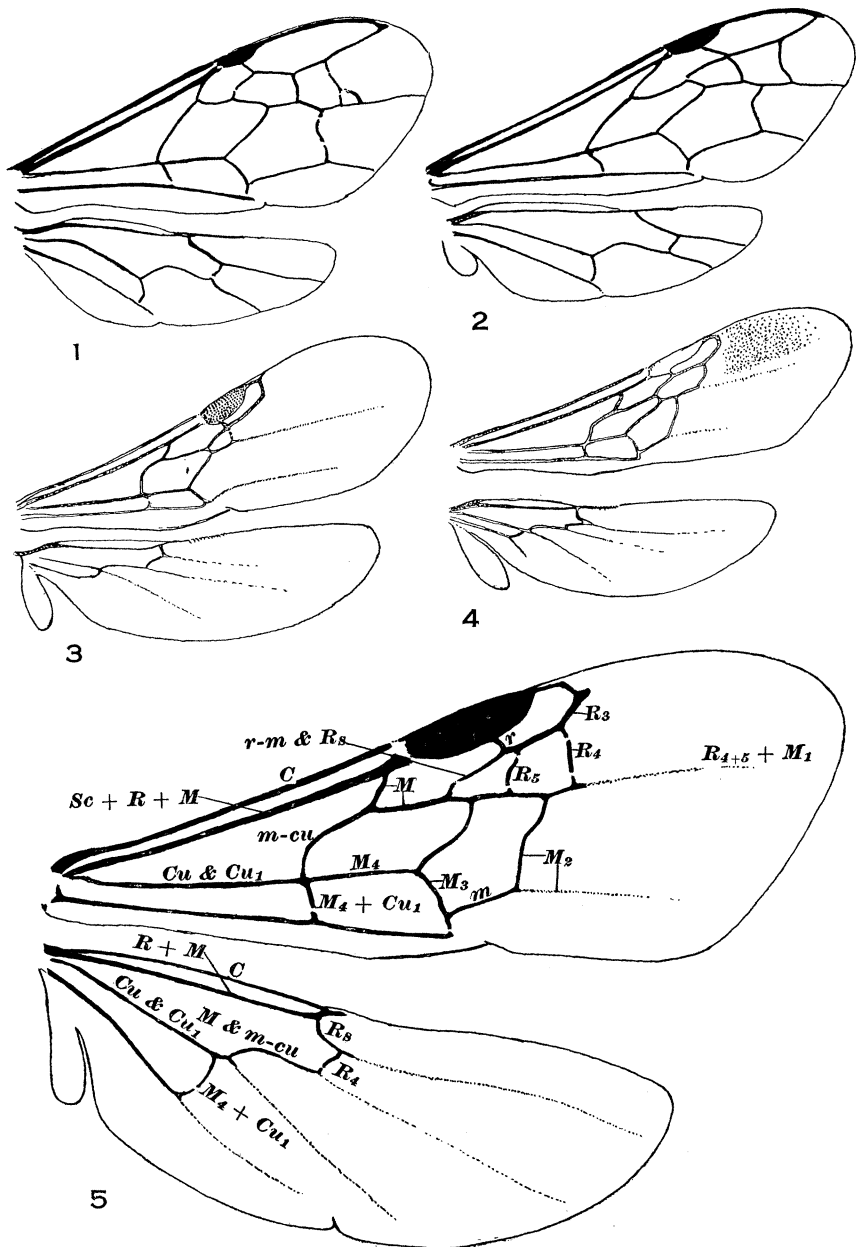
Fig. 45.—*Brachycistis dentata* Bradley; holotype; dextral aspect of left half.

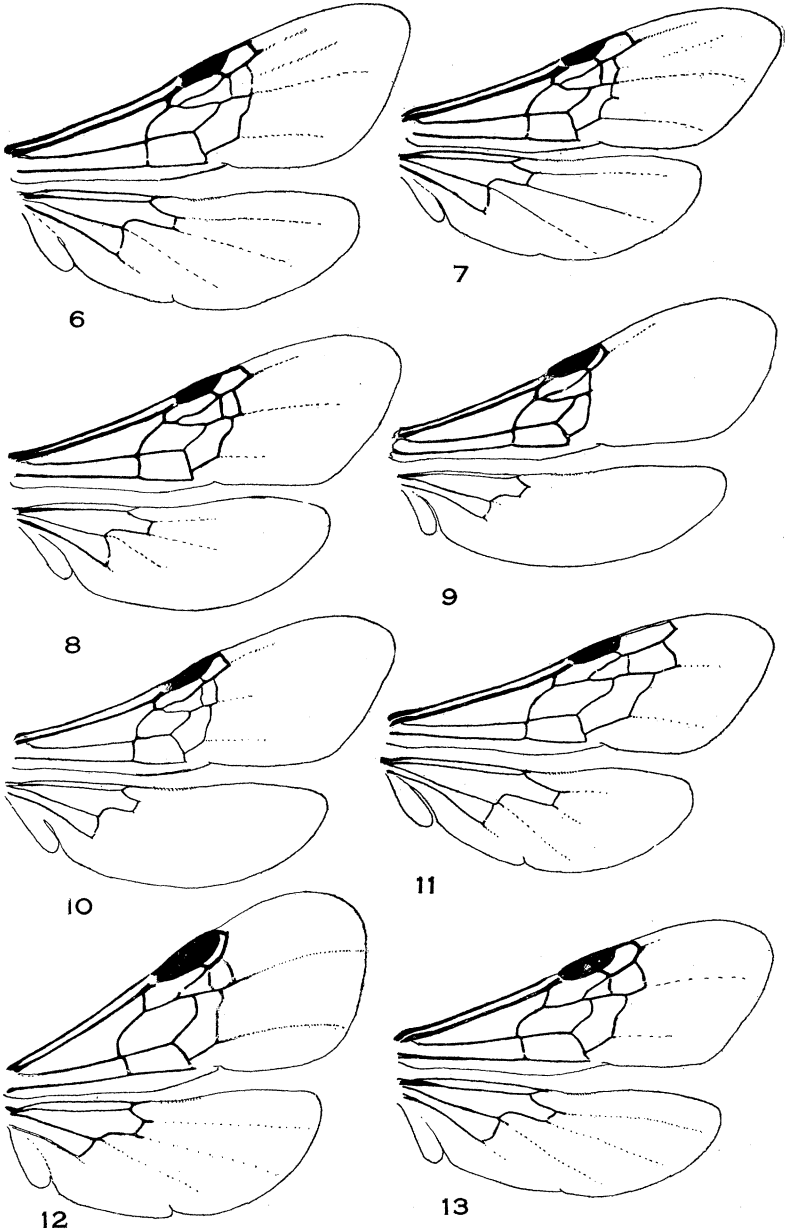
Fig. 46.—*Brachycistis triangularis* Fox; paratype; dextral aspect.

Fig. 47.—*Brachycistis triangularis* Fox; paratype; dorsal aspect of uncus.

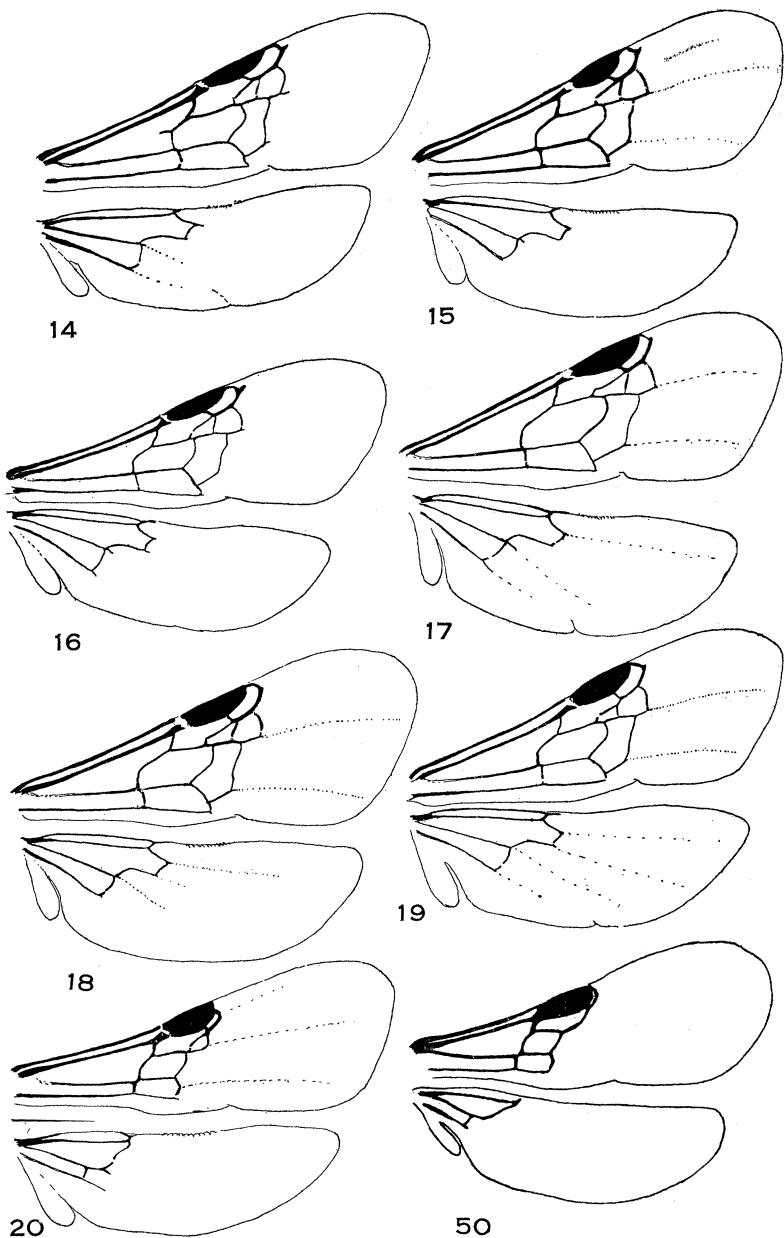
Fig. 48.—*Brachycistis elegantula* Cockerell; paratype?; dextral aspect.

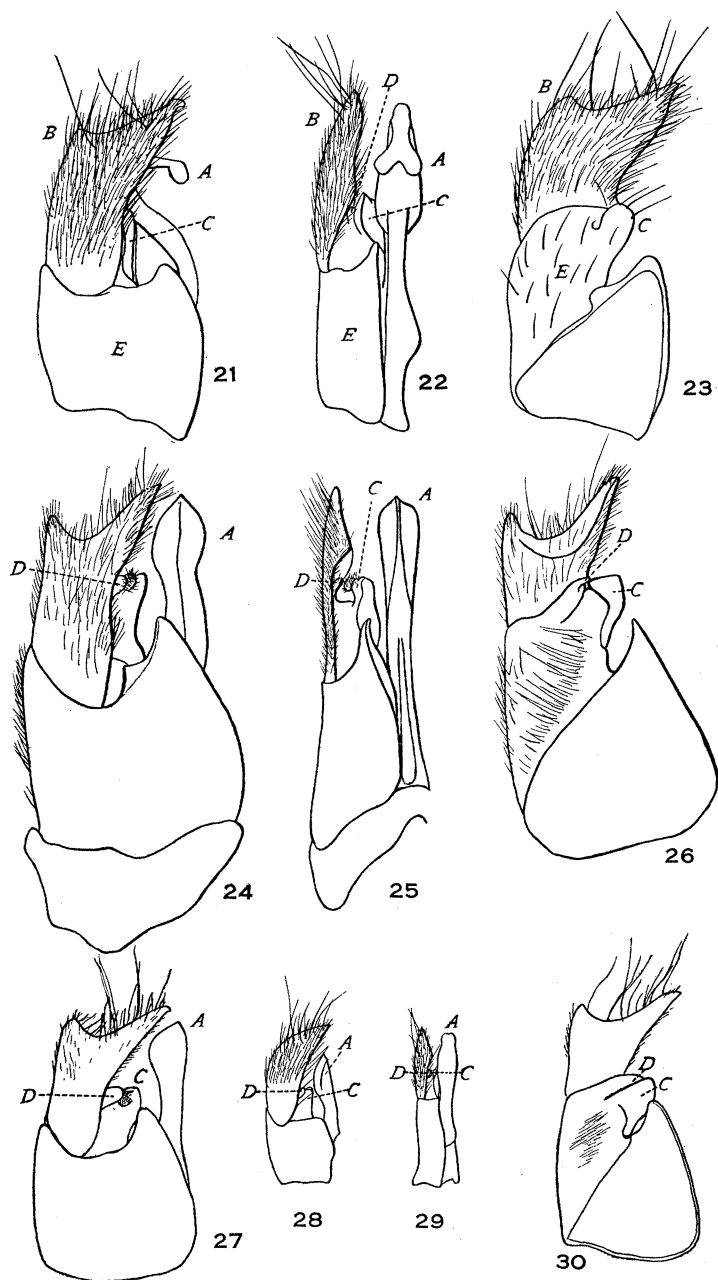
Fig. 49.—*Brachycistis inaequalis* Fox; paratype; dextral aspect of left half.

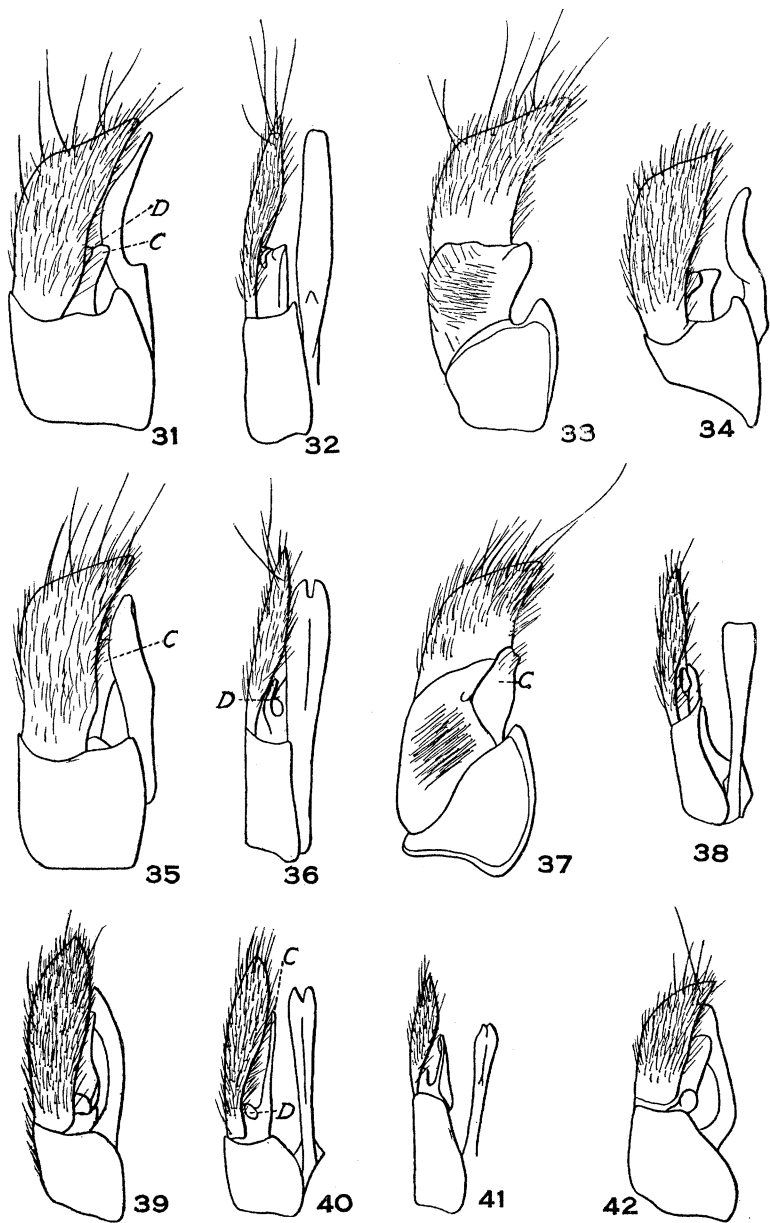




BRADLEY—NORTH AMERICAN MYRMOSIDAE







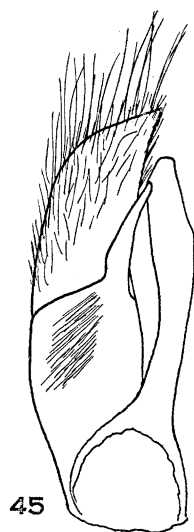
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